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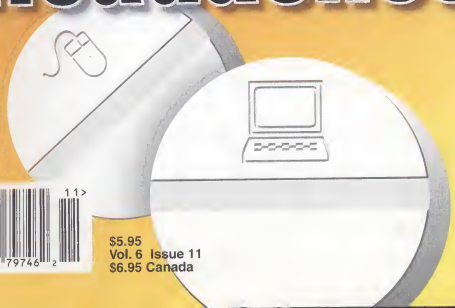

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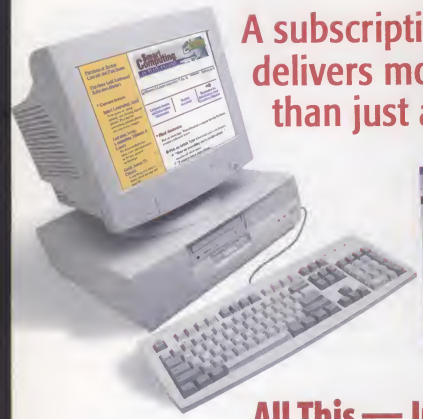

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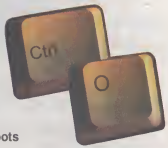

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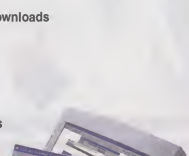

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Troubleshoot Away

Knowledge, Clear Thinking, Tools & Process Of Elimination Often Are All It Takes

Computers are complex machines, but they're not holy relics. They can be handled and prodded, dissected and reassembled. Even a novice has a good shot at being able to effectively troubleshoot a PC when—not if—it fails. The fact is, troubleshooting a computer is much like troubleshooting any other machine. When the brushes on a vacuum cleaner stop spinning, do you panic and call a Ph.D.? No, the belt probably slipped off, so you grab a screwdriver and fix it. All PC troubleshooting requires is a little knowledge, clear thinking, a few tools, and a step-by-step process of elimination.

Tools Of The Trade. A troubleshooter's most important and valuable tool is the one between her shoulders. Some important questions to ponder are: "What exactly is happening here?" and "What recent changes have I made that could be the cause?" Then, using a step-by-step process of elimination, you can narrow the trouble down to a specific component or application.

Diagnostic software utilities check the many parts of your computer and report if they find any problems. Running ScanDisk (click Start, Programs, Accessories, System Tools, ScanDisk) in Thorough mode is a good way to check your hard drive's general health. (For Windows NT or Windows 2000, you can use Chkdsk). For other parts of your computer, however, you might want to obtain troubleshooting software. Some popular products include Symantec's Norton Utilities (http://www.symantec.com), Touchstone's CheckIt (http://www.checkit.com), and Ultra-X's QuickTechPro and Ram Stress Test (http://www.ultra-x.co.uk). Many such utilities are available in a free trial version.

The Device Manager in Windows is a list of every device installed in your computer. It can be useful in tracking down hardware conflicts (where two or more devices are fighting over resources), device driver errors, and other problems. You can find it in the Control Panel by double-clicking System, then choosing the Device Manager tab. If Windows detects a conflict or other problem, the affected device will be highlighted with a warning symbol (like a yellow exclamation point or a red X). Highlight the problem device, click the Properties button, and check the Device Status area for a description of the trouble.

Troubleshooting Hardware. *WARNING: Before working on the delicate components of your computer, make sure you take precautions against static electricity. Work in a static-free area, if possible, and always touch the metal of the computer case to discharge static before touching anything inside. If possible, wear an antistatic wrist strap or other device.*

There are hundreds of components that make up a modern computer system, and it is beyond the scope of this article to address each of them. However, there are basically five causes of hardware failures. Knowing these and how they can manifest in hardware will immensely help your troubleshooting efforts.

1. **Overheating.** In normal operation, the computer draws a lot of power, some of which is eventually converted into heat. Heat wears down many parts over time, and components that overheat will fail. A common symptom of overheating is when the computer works fine for a while, then delivers error messages or locks up with no apparent cause.
   Suspect components: CPU (central processing unit), power supply, video card, motherboard, high-speed hard drive
2. **Mechanical failure.** Every moving part, including the parts inside a computer, eventually wears out because of friction. Mechanical problems are usually easy to spot. Failing parts make strange noises or don't function correctly.
   Suspect components: fans, hard drive, all other types of drives
3. **Physical trauma.** While computers are more durable today than ever before, they are still sensitive to bumps and bangs.

Suspect components: anything with delicate internal parts, such as a hard drive or CD-ROM drive; in extreme cases, everything

4. **Power surges.** Power surges can cause all sorts of havoc in a computer. While users employing "surge suppressors" may feel safe from such dangers, there is no guarantee against all the various types of "dirty" power. You can only stop brownouts, surges, and spikes by using a UPS (uninterruptible power supply) with a built-in voltage regulator. A UPS insulates the computer from the wall power.

   Suspect components: power supply; motherboard; CPU; RAM (random-access memory); in extreme cases, everything

5. **Newly-added hardware.** Upgrading a computer can cause resource conflicts and other errors. Fortunately, it's easy to diagnose problems if they appear right after an upgrade—just remove the new part and see if the problem disappears.

   Suspect components: any newly installed device, especially ISA (Industry Standard Architecture) cards

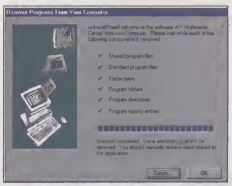
Troubleshooting these problems is easier than it looks. The first thing to do is to eliminate the obvious. Make sure everything is plugged in and turned on. Double-check that all your cables and wires are correctly connected, both inside and outside the computer. Unplug and replug them if you're in doubt. Make sure that all cards and memory modules are well seated in clean slots.

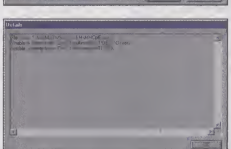
After turning off the PC and unplugging the power cord, remove the parts, blow out their slots (preferably with compressed air), and plug them back in. Listen for strange noises and determine where they are coming from. (A loud noise from the hard drive is a bad sign.) Make sure all the fans are spinning smoothly, as a slow or stopped fan (commonly caused by nearby wires pressing on the blades) can quickly lead to overheating. Check that the hard drive, diskette drive, and other drives are receiving power. You can usually see their LEDs (light-emitting diodes) light up when you power on the computer.

Narrow The Search.

Once you have covered the basics you can narrow down the search. First, think hard about the problem. What exactly seems to be happening? What, if anything, has changed since the last time your computer worked correctly? What error messages appear, if any? Does the problem happen consistently, or is it intermittent? Are there any other clues as to the cause of the failure? Once you have the nature of the problem firmly in mind, you can confidently troubleshoot it.

The software tools mentioned previously come in handy at this point. Using diagnostic software can sometimes tell you exactly what's wrong, or if not, at least eliminate particular components from suspicion. It's useful to have such software for intermittent problems, or those that only show up after a while, because you can let the software run unattended for some time. (This is usually called a burn-in test.)





Despite the promise of a clean removal, not all uninstallations are complete. Use the Details button to see what work Windows has left for you and delete these stragglers.

If you don't have any diagnostic software, or if the software didn't come up with anything, you can still troubleshoot the computer using a process of elimination. First, disconnect and remove any unnecessary internal hardware. This usually means everything except the power supply, motherboard, CPU, memory, video card, and hard drive. Then, if the problem has disappeared, you know the culprit is one of the components you removed. If the problem is still there, you will need to swap or remove the remaining components one at a time to narrow it down to one or two. *(NOTE: If you find one bad component, don't stop there. Power surges are notorious for taking out multiple components, so be thorough and test everything.)*

Having a second PC on hand, even one borrowed from a friend, is useful at this point. Not only can you use the backup to download diagnostic software, but it can also serve as a test bed. For example, if you suspect your video card is bad, try plugging it into the second computer and see if the same problem occurs. Conversely, you can plug the backup video card into the problem computer. You can test virtually every component of your computer this way, although it might take some time to install drivers and such.

The only parts you will want to avoid swapping are your CPU and motherboard. While there's a chance they're compatible with each other, it's not worth the risk, because permanent damage can occur if you run a CPU in an incompatible or improperly configured motherboard. Unless you really know what you're doing, you should take it to a professional for testing.

Troubleshooting Walk-Through.

Let's say one day you find your computer is dead. You turn it on, but the screen stays black. How are you going to figure out what's wrong? It's time to break out the troubleshooting skills.

The first thing to do is test the monitor. You check by hooking it up to a friend's computer, where it works just fine.

Compressed air is moisture-free and specifically designed for cleaning the dust from electronics equipment. Every few months, it's a good idea to open your system and use a can of air to clean the system. Be sure to follow the can's recommended instructions.

Now, you focus your attention on the computer. You open it up and take a look inside, being cautious about static discharge. You make sure all the cables and cards are properly connected and cleanly seated. Since diagnostic software is out of the question (the system is dead, right?), you must go to the process of elimination to narrow your suspects. In this case, you disconnect everything in the computer except the power supply, the motherboard, CPU, RAM, and video card and attempt to boot up the computer. If it boots successfully, you know the problem is with one of the parts you disconnected. Merely plug them back in one at a time, rebooting each time, until it fails again. The last part before the failure is probably the bad one.

Let's say that removing all those components still results in a dead computer. Now, you try to discover which of the remaining parts is at fault. You can make use of the computer's self-test to find the culprit. Removing the video card, you try to boot the computer without it. The computer should give a series of short beeps. This indicates that the self-test has found no video card, and that the remaining components are probably OK. If there are no beeps, try removing the memory modules and booting without them. You should hear some long beeps from the computer. If so, your memory is probably at fault (because everything else checks out). If you still hear nothing, it's about time to take the computer in to a professional. Let him know what you did so he doesn't waste time repeating the process.

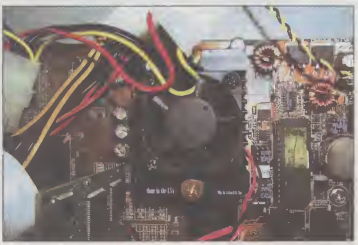
Troubleshooting Software.

WARNING: Always make sure you have a good backup of any essential data (documents, accounting information, and such) before messing around with your software. This way, if something goes wrong, you still have the important stuff intact.

Before embarking on software troubleshooting, note that many problems that seem to stem from bad software can be caused by hardware failure. If a problem is suspected, using a diagnostic utility of some kind is warranted. At the least, you should run ScanDisk or Chkdsk to eliminate hard drive errors. Problematic memory (RAM) can also cause subtle errors and should be checked as well, especially if you do important work on your computer.

Software problems can be difficult to diagnose. Windows itself has a reputation for being temperamental, let alone when it's burdened by all the additional software we install. Poorly written or buggy software is freely available over the Internet, and the problems it can cause can be disastrous. Thousands of malicious programs, in the form of viruses or worms, can infiltrate an unsuspecting system and eat it from the inside. It's wise to be picky about what you install on your computer and always use a virus checker just to be sure.

Like troubleshooting hardware, troubleshooting software requires methodical consideration of your circumstances. First, think carefully about any software you have recently installed. Could it be causing the problem?



Sometimes, gravity will pull a stray wire into an internal fan, either fully or partially blocking its blades. But more often users will forget to tuck their wires safely away after working inside the chassis.

Especially suspicious are applications that leave programs running in the background. Such TSRs (terminate-and-stay-resident programs) are virtually invisible and run all the time. Poorly written ones could easily disrupt the flow of your Windows session. Next, try to figure out if any actions on your part trigger the error. If the problem appears in more than one place, figure out if the problems have anything in common that could point to the culprit.

Next, use a process of elimination. If you suspect a particular piece of software, try uninstalling it. This can be as simple as double-clicking Add/Remove Programs in the Control Panel. If the Uninstall utility says it couldn't remove all of the applications components, click the Details button (if there is one) to determine what was left and go remove it manually. If this doesn't work, or you can't narrow it down to one program, try checking your system files, using the System File Checker (access it by clicking Start, Programs, Accessories, System Tools, and System Information, then click Tools, System File Checker). This might catch a corrupted or missing system file that is causing the problem. If you suspect that a bad driver causes the error, you can try deleting that device temporarily from the Device Manager (open Control Panel, double-click System, then choose the Device Manager tab) to see if the problem goes away.

Something More.

Let's say you've tried all that and the problem still occurs. Is there something more you can try? Sure, if you're willing to do a little gambling. If all else fails, you can try reinstalling Windows. At first, you should try to reinstall over your existing Windows without erasing your hard drive. If successful, this will replace all your essential files while keeping your existing settings and data. Don't forget about backing up all of your important files beforehand, though, as there's always a chance of failure that could destroy access to your work. If the reinstall was successful but didn't fix the problem, your last resort is to wipe your hard drive clean and start over. This is a pain, but if the problem is annoying, it's worth it.

Good troubleshooters aren't defined by the tools they employ, but by their state of mind. An open-minded look at the circumstances surrounding a problem, fair knowledge of how a computer works, and the willingness to methodically eliminate possibilities in a step-by-step process are all that's needed to successfully diagnose and repair a computer problem. A decent budget doesn't hurt, either, as there is usually some expense involved: at the least, the cost of a replacement for the bad part.

If you fall short, however, and can't figure out the problem, don't despair. You can find a good computer technician at most locally operated computer stores. Feel free to shop around until you find one you feel comfortable with. Professional technicians have the experience and equipment necessary to find problems that might elude you, and the work you did beforehand will save the professional's time, and your money, in the end. LS

by William Van Winkle

Give PC Troubles The Boot

The First Steps To Take When Trouble Strikes

Help! Really, computing shouldn't be this hard. Oh, sure, when computers work, everyone's a smiling hacker manipulating the microworld. But when it comes to troubleshooting a problem, even computer cognoscenti tremble and curse "now what?"

Freezes. Crashes. Viruses. Bugs. Computers that inexplicably won't start. Failed hard drives. The dreaded blue screen of death. *Ay-yi-yi!* Digital disasters can strike without warning or explanation and can wipe out everything stored on your PC.

If that's not scary enough, getting help, or even a straight answer, can be a frustrating exercise in finger-pointing. Call the hardware manufacturer, and it'll tell you it's the software. Call the software publisher and it'll swear it's the hardware. To be fair, with so many high-tech hardware and software products, it's physically and financially impossible for every maker to test the compatibility of each other's products with every possible hardware and software configuration. Mix in different versions of Windows, constantly evolving software, Byzantine hardware configurations, competing ISPs (Internet service providers), modems, browsers, and e-mail and it's a wonder anything works at all.

But what makes the diagnostic process so maddening is that on the surface, many symptoms appear to point to one thing, but the underlying problem, in all-too-many cases, resides elsewhere. Is it a hardware or software problem? CPU (central processing unit) or monitor? Browser or ISP? Modem or phone line? If it sounds hopeless, it's not. In fact, there have never been more troubleshooting troubadours ready to respond to your clarion call for help.

Run a diagnostic or repair utility. Call technical support. Go online. Read the manual. With proper planning, PC maintenance, the right Windows utilities, and a little luck, you can prevent most problems from occurring and fix many others if, and when, they rear their ugly heads. Granted, with thousands of possible computer configurations and potential bottlenecks, we can't promise that you'll never have a problem or be forced to call technical support. But if you follow the advice here, you'll do it less often and be better prepared when you do.

Here's how it works. If you've just unpacked your PC, or the one you have is problem-free, keep reading. If you're in crisis mode, jump to "Part II: Dealing With Disasters."

Part I: Disaster-Proof Your PC.

You've heard it a zillion times. The best offense is a great defense. In troubleshooting-speak it means the best way to prevent PC problems is to catch them before they happen. Here's how:

Create a backup plan. The most important thing you can do to protect data and crucial configuration settings is to back them up regularly and, even more important, reliably. That way, if you ever have a minor mishap or deadly dilemma, just like the pros you can quickly put your system back the way it was and return to work in an hour or two. Back up data daily and save work often. Test backup software and learn how to restore files *before a crisis*, advises William Goldstein, a Los Angeles-based PC and Web consultant.

Store files offsite. Backups are great in case of a hard drive crash, but what happens if the backup disks or tapes are defective, stolen, or destroyed in a fire or flood? One of the fastest ways to get your data when you need it is to store it online at sites such as Connected ($6.95 a month for up to 100MB (megabytes) or $14.95 for unlimited megabytes, a one-month demo is free; http://www.connected.com) or free storage sites such as Xdrive (http://www.xdrive.com) or netdrive.com (http://www.netdrive.com).

Drive Rx. At least once or twice a month, run Windows 98 diagnostic and repair utilities such as ScanDisk, Disk Cleanup, and Disk Defragmenter—especially after a crash or freeze-up. They're all located under Start, Programs, Accessories, System Tools.

ER disk. An emergency bootable diskette (also called a startup diskette) can revive your system and edit important files when disaster strikes and you can't start Windows from your hard drive. It's an important tool in your recovery arsenal and usually one of the first things tech support will ask for when you call for help. To create one, insert a blank diskette into the drive, open Control Panel, double-click Add/Remove Programs, select the Startup tab, and click Create Disk. *Tip:*

Most utility and antivirus programs create their own bootable diskettes.

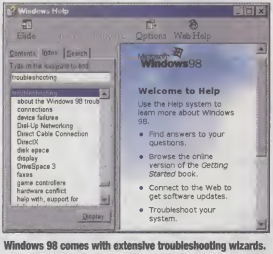
Invest in utilities. The most expensive mistake you can make is buying separate disk utilities for antivirus, troubleshooting, uninstalling, diagnosing, and repair. Both Network Associ-ates and Symantec have crammed their top-of-the-line performers into powerful yet inexpensive software suites. McAfee Office includes ViruScan, First Aid, McAfee Utilities, Un-Installer, and Oil Change ($50; 800/338-8754, 408/988-3832; http://www.mcafee.com); while Symantec counters with Norton SystemWorks, which includes Norton Utilities, Norton AntiVirus, Norton CrashGuard, Norton CleanSweep, and LiveUpdate Pro ($60; 800/441-7234, 541/334-6054; http://www.symantec.com). Both guard against virus attacks, repair software, diagnose hardware problems, optimize system performance, and uninstall software programs. Both include crash protection utilities and can create rescue diskettes. Both have tools that take snapshots of your hard drive system directories letting you restore an accidentally reformatted hard drive. *Caution:* Buy one or the other. Do not mix and match utilities or run both virus checkers.

Never manually delete applications. Uninstallers in Norton SystemWorks and McAfee Office can remove unwanted applications, orphaned Registry entries, and Internet cache files. New features monitor installations, meticulously tracking every file and system change. If something goes wrong, they can safely extract the software and put your system back the way it was.

Turn back time. A less radical solution than uninstalling software is a new breed of utilities that can magically restore your computer to a prior, happier state when everything worked properly. Adaptec's GoBack ($69.95; 888/945-3345, 408/945-8600 http://www.goback.com) and PowerQuest's SecondChance ($50; 800/379-2566, 801/437-8900; http://www.powerquest.com) run in the background, tracking disk activity in a way that lets them return your system to precisely the way it was an hour ago, yesterday, or last month. You can restore individual files, versions of files, or the entire system to a designated time. Both products devour almost 10% of your hard drive depending on configuration. However, their speedy rollback solution more than makes up for any inconvenience the first time you can circumvent a Windows-won't-boot catastrophe.

Buy an inexpensive keyboard, mouse, and modem. The fastest way to tell if you have a hardware vs. a software problem is to either replace the hardware or test it on another system. If the problem follows the device, you know it's the hardware. If it doesn't, take a look at the software. You can find a cheap keyboard and mouse—even a modem—for between $5 and $50 at office and computer superstores. You don't have to like them, or even use them for very long, but they're a lifesaver in times of trouble.

Windows 95 Repair Kit. The best way to fix Win95 is to upgrade to Win98. You'll get all the under-the-hood improvements Microsoft has dolled out over the years, plus more powerful diagnostic tools, improved uninstall capabilities, and an Upgrade Wizard that uses the Web to ensure you have the latest Win98 components, hardware drivers, and software patches.



Windows 98 comes with extensive troubleshooting wizards.

Fight upgrade fever. With so many new products, upgrades, patches, and fixes released, it seems like no sooner do you tweak one application than there is another patch, upgrade, security flaw, or bug. Yet fixing one thing can open Pandora's box as computers can be waylaid by something as simple as shutting down without exiting properly or a single corrupted file. Don't upgrade simply because a new version is available. Stay away from beta versions. Let others be software guinea pigs. If it ain't broke, don't download it.

Readme, really. Before installing any new software, read the Readme text file that is provided. Software makers list known problems and bugaboos. Heed their advice. If it says to deactivate virus software before installation, do so.

Is tech support awake? Sure, it's quiet at 2 a.m., but if your software or hardware maker's tech support line is closed, whom are you going to call if something goes awry? Even if the vendor offers 24/7 support, call during working hours. Chances are you'll wait longer to talk to a tech, but you're more likely to get a better-informed operator who has access to more senior staff.

Use protection. Unexpected electricity jolts can fry your computer and hardware add-ons. You're especially vulnerable if there's older wiring in your house. A good surge protector with four to six outlets and a phone jack costs about $50 and has a UL 1449 surge protection rating of 330 volts. Many manufacturers, such as Panamax (800/472-5555, 415/499-3900; http://www.panamax.com), offer warranties on connected equipment.

Tip: If you live in an area where power outages are common, troubleshooting pros recommend safeguarding your PC with an uninterruptible power supply such as the APC Back-UPS Pro USB 500 Clear ($199; 800/800-4272; http://www.apc.com) or Opti-UPS 420es ($149; 888/678-4877, 714/674-5080; http://www.opti-ups.com). Instead of losing data during a blackout, a UPS keeps your PC alive and kicking for between 10 and 20 minutes, which is more than enough time to save your data and exit Windows safely.

Part II: Deal With Disasters.

You have a problem. Something isn't doing what it's supposed to. Here are the steps troubleshooting experts follow. Like any good digital detective, always start with the most obvious problems and solutions, then drill down to the more complex ones. Remember: If you've followed the maintenance steps in Part I, in most cases, the overwhelming majority of PC problems you'll encounter are generally easy fixes *once you pinpoint the problem*, Goldstein says. If you have a choice of running diagnostic software or opening your PC and rooting around, always opt for the simple solution.

System Crash Checklist.

Forget coffee. Nothing gets your heart pumping faster than calmly starting your PC on a busy morning and getting a system freeze, lockup, or worse, nothing at all. Don't panic (granted, easier said than done). Instead, follow these tips:

Reboot problems away. It's inevitable for a computer to crash or software to inexplicably

stop working every now and again. You can solve the majority of computer problems simply by exiting whatever you're working on, turning off the system, waiting at least 10 seconds, and then rebooting. This is called "joott"—just one of those things.

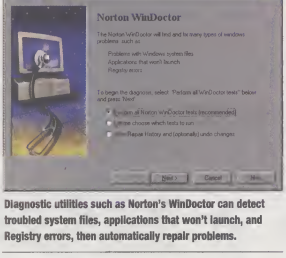
Listen to your mother. If the problem persists, or the application won't open, or your PC won't start, remember your mother's advice and "look with your eyes open." Check simple solutions first. Turn off and unplug the PC. Physically recheck all cables and cards. Are they properly connected and plugged into outlets? Does the outlet work? Is everything turned on, plugged in, and attached correctly? Is your printer offline? Is there paper in the tray? Has your surge protector been tripped? If your PC is connected to a power control center, make sure both are plugged in and turned on. If so, try bypassing the power control center. Try an alternative power cord.

Check your PC for clues. Restart your PC and carefully watch your monitor for clues to a hardware failure. When a component successfully initializes, a confirmation message generally flashes on the screen. If a hard drive, mouse, or other component is malfunctioning, your PC may display a failure message pointing to the problem. If messages flash on-screen too quickly to read, you can freeze the screen by pressing the PAUSE key.

Is it safe? Unless Windows is damaged beyond repair, it will launch in Safe mode. Start Windows in Safe mode by holding down the F8 function key before Windows boots. If it starts, the problem is probably a corrupted Registry file, damaged or missing system files, or another Windows-related problem.

Bad drivers. If your PC boots in Safe mode, reboot, return to the Windows Startup menu, and choose Step-By-Step Confirmation. By loading one driver at a time you can identify which driver or component doesn't want to play well with others.

Hardware hang-ups. Open Control Panel, double-click System, and select the Device Manager tab. If a PC component is marked with a yellow circle and exclamation point, double-click the component's name. Click Properties and the Device Status box tells you if the component is working properly. If you find a conflict, for example the printer and scanner, under Device Usage, check the Disable In This Hardware Profile box or turn off your PC, unplug one device, and reboot.


Norton WinDoctor Wizard
Norton WinDoctor
The Norton WinDoctor will find and fix many types of windows problems, such as:
Problems with Windows system files
Applications that won't launch
Registry errors
To begin the diagnosis, select "Perform all WinDoctor tests" below and press "Next".
Perform all Norton WinDoctor tests (recommended)
Let me choose which tests to run
Repair History and (optionally) undo changes
Next >
Cancel
Help

Diagnostic utilities such as Norton's WinDoctor can detect troubled system files, applications that won't launch, and Registry errors, then automatically repair problems.

Don't load up on startup. Most utility suites and many applications automatically load components at startup, gobbling up processing power and memory. The next time you notice degradation in PC performance, before making any wholesale system changes, try closing programs that run in the background such as antivirus, crash protection, and any monitoring software. To see what Win98 loads upon awakening, click Start, Run and type **msconfig**. Click OK and when the System Configuration Utility appears, click the Startup tab. Use your mouse to clear the checkboxes next to the programs you want Windows to stop loading.

Get rid of doubles. While inside the System Configuration Utility, look for duplicate entries. Uncheck one of the boxes. Click Apply, then Close. Reboot.

Undo recent changes. If you've added or removed software or hardware, there's a good chance those changes are causing problems. Turn to uninstallers such as CleanSweep or rollback utilities such as SecondChance to reverse the damage.

Check Registry files. Both Norton and McAfee have utilities that scan and repair Registry errors, fix problems with Windows system files, and help applications that won't launch. You can also download RegClean, a free utility from Microsoft at http://support.microsoft.com/support/kb/articles/Q147/7/69.asp. If you can't repair the problem, Win98's ScanReg works like a mini-GoBack storing five days of Registry backups.

RAM tough. If you're experiencing mysterious problems such as system freezes, program crashes, general protection faults, and corrupted data, test your RAM (random-access memory) using American Megatrend's AMIDiag ($99; 800/828-9264, 770/246-8600; http://www.ami.com). If a problem is found, you can't repair RAM, only replace it.

Dead drive. If your hard drive starts acting up, unexplained delays or pauses could simply mean you're out of space. You can delete files or copy them to diskettes or tapes, but your best bet is to buy a bigger hard drive. If your drive has trouble retrieving previously stored data, running ScanDisk or Norton's Disk Doctor can warn you before failure.

Dead data. Viruses, buggy software, and even power failures can cause good data to go bad. When the FAT (file allocation table) becomes corrupted, file system problems can infect your entire drive. Running Windows ScanDisk and utilities such as Norton Disk Doctor daily or immediately after a system crash or power failure can repair most file system problems.

Ask your PC. Win98 comes with extensive troubleshooting wizards and tips. Click Start, Help, select the Index tab and type **troubleshooting** in the Type In The Keyword To Find field.

Part III: Fix Hardware Problems.

Here are 10 common hardware problems, their probable causes, and what you can to do to fix them.

Symptom: Frequent crashes, system freezes, corrupted data, Windows general protection faults.

Probable Cause: Poorly seated CPU, CPU fan, or RAM.

Treatment: Turn off your PC, open the case, and reseat the CPU in its socket. Remove and reinstall RAM. With the case still open, turn on your PC and check to see if the CPU fan is running and firmly attached to the case. Also try software such as AMIDiag or WinRamTurbo ($19; http://www.scselp.com/winramturbo).

Symptom: Disk utilities such as ScanDisk or Norton Disk Doctor regularly report new bad sectors on your hard disk.

Probable Cause: Failing hard drive.

Treatment: Run disk utilities. Back up your data. Buy a new hard drive.

Symptom: Your PC is on, but nothing appears on your monitor.

Probable Cause: Monitor cable connection or dead monitor.

Treatment: Make sure monitor and power cables are firmly attached, monitor power is on, and electrical outlets are live. Check to see

if brightness is turned up. Try connecting another monitor to the PC or attach this monitor to another PC to confirm whether it is the monitor or the PC that needs repair.

Symptom: Your PC is on but no boot disk is found and/or the CD-ROM drive, modem, Zip drive, scanner, or other add-on accessory is unavailable.

Probable Cause: Loose or disconnected drive cables.

Treatment: Turn off your PC, open the case, and check that the data ribbon cables are firmly connected to both the motherboard and the drives. Make sure a power cable connects to each drive.

Symptom: System starts crashing several minutes after being turned on. CPU heats up then crashes or freezes.

Probable Cause: CPU fan is broken or clogged by dust.

Treatment: Turn off your PC. Open the case. Blow out dust using compressed air. With the case still open, turn on PC. If the fan isn't working or makes a grinding sound, replace the fan.

Symptom: Keyboard keys stick or repeat.

Probable Cause: Dust, dirt, hair, and other gunk is in the key switches.

Treatment: Turn off your PC. Disconnect your keyboard. Turn it upside down and gently shake out all the junk. Spray compressed air between the keys. To clean the keys, spray window cleaner on a cloth (*not* on the keyboard) and wipe away the dirt. If the key still sticks, carefully pry off the cap of the broken key and blow out dirt with compressed air. If the key still doesn't work, buy a new keyboard.

Symptom: Mouse doesn't appear on-screen, sticks, or doesn't work.

Probable Cause: Mouse cable is loose. If you're using a wireless mouse, check all connections and the batteries. Dirt is gumming up the mouse ball. Mouse drive corrupted.

Treatment: Turn off PC. Check all connections. Make sure mouse cable is firmly connected to the right port. Replace batteries in wireless mouse receiver. Open mouse, blow out dirt with compressed air, and clean the roller using a cotton swab or Q-tip moistened lightly with isopropyl rubbing alcohol. Download and install new mouse driver from manufacturer.

Symptom: Monitor color display is distorted and/or flickering.

Probable Cause. Refresh rate needs adjusting. Loose monitor cable or video card.

Treatment: For flickering, open Control Panel, click Display, select the Settings tab, and click Advanced, then Adapter. Under Refresh Rate, click the drop-down arrow, select Optimal, then click OK twice. You may have to reboot to engage changes. If that doesn't work, try downloading a new monitor driver. Check monitor cables. Open case and reseat the graphics card. Check to see if there are bent pins on the connector end of the cable. If so, carefully straighten them out using needle nose pliers. If you have another PC or notebook handy, plug your monitor into it. If it works, replace the graphics card. Try adjusting monitor controls.

Symptom: Modem isn't working or seems to be working slower.

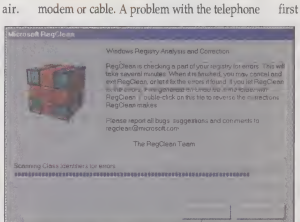
Probable Cause: Loose or disconnected modem or cable. A problem with the telephone line or ISP. Dial-in script is not configured properly.

Treatment: For external modems, check connections and cables. If the modem lights are blinking, that's a giveaway the modem is trying to make a connection. Make sure internal modem is seated properly. If your phone line is working, call your ISP and review your dial-in scripts and modem configurations. If you have two lines in the house, try connecting the modem to the second line and see what happens. If it connects, you know there's a problem on the other line. Call your local phone company.

Symptom: Printer isn't working.

Probable Cause: Loose cable connection. Printer is offline. Toner cartridge is damaged. PC is sending too much information or confusing information to your printer.

Treatment: Check connections, make sure printer is online. Change toner cartridge. Turn printer and PC off, wait several seconds, restart. This should clear whatever is jamming up the memory. If that doesn't work, turn everything off again, then restart your computer first, wait until it goes through its entire setup routine, and then turn on your printer. If your printer works, the problem is that your PC is sending confusing signals to your printer at startup. Check the application that you're using to print the file.


Microsoft RegClean
Windows Registry Analysis and Correction
RegClean is checking a part of your registry for errors. This will take several minutes. When it's finished, you may cancel and exit RegClean, or search for more if desired. If you let RegClean fix the errors, it will generate an Undo file automatically. RegClean will create a backup file so that you can undo the changes RegClean makes.
Please report all bugs, suggestions and comments to regclean@microsoft.com
The RegClean Team
Scanning Class identifiers for errors

The Windows 98 RegClean utility repairs damaged Registry files.

Web Diagnosis. Still stymied by a problem? If you can jump on the Web, there are plenty of sites for troubleshooting tips and solutions. Your first stop should always be the manufacturer of the software, hardware, or peripheral that you think is causing the problem. If you can't find the answers you need, check out these alternative third-party tech-support sites.

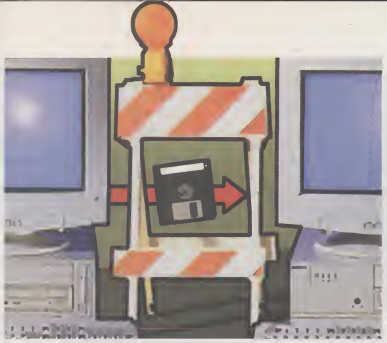
For help with your computer and Windows, first check out Smart Computing's Web site, http://www.smartcomputing.com. Also check out Computing.Net (http://www.computing.net). For questions about software applications, browse over to ePeople (http://www.nowonder.com). For applications such as printers and modems, you'll find the answers at 32bit.com (http://www.32bit.com) and VirtualDr (http://www.virtualdr.com).

Keep in mind some of these services, such as Computing.Net, are free, while others such as ePeople get qualified service providers to "bid" on your question. You pick a response based on qualifications, rating, or price.

If you're running Windows 95/98/NT or Windows 2000 and use Internet Explorer 4.x, check out PC Pitstop (http://www.pcpitstop.com). This site runs diagnostic tests on your system's Internet connections, hard drive, memory, and security settings, and it suggests fixes.

To use these sites, you'll need to know what kind of PC you're using, the version of Windows, plus information about your system's components. To find hardware information, in Win98, select Start, Programs, Accessories, System Tools, then System Information. Start your message with a brief description of the problem. Keep it simple. The goal is to include as much relevant information as you can into your query. LS

by Michael Cahlin



How To . . .

Move Files From One PC To Another

At its most basic level, sharing files between two computers is an easy process. You find a storage medium both computers involved can use, you copy the file from the origination PC to the transfer medium, and you finally copy the file from the transfer medium to the destination PC. A piece of cake, right?

As easy as it may sounds, plenty of potential problems lurk just beneath the surface.

What You Need To Know

Benefits
File sharing makes it simple for telecommuters and mobile professionals to exchange information with the home office and update office files when changes occur.

Tools
None, unless you find hardware problems

Time
15 minutes or longer, depending on hardware problems

Easy to Intermediate

Skill Level
Easy to Intermediate

$$$

Cost
None, unless you have to replace hardware

For instance, selecting a medium to use for the file transfer isn't always easy. And making sure the files will be usable in their new destination isn't always easy, either.

We'll help you determine which type of transfer medium is best for moving your files from one computer to another. We'll then discuss some of the things that can go wrong during the transfer and help you fix them.

Make The Transfer.

Here are some of your options for transferring files from one PC to another.

Direct cable. In Windows 98, you can use one of the operating system's utilities, Direct Cable Connection, to move files between PCs through a serial or parallel cable. Click Start, Programs, Accessories, Communications, and Direct Cable Connection to start the utility program. (You might need to install the utility from your Win98 CD-ROM.)

Diskette. A diskette is the easiest method for moving files because nearly every Windows-based computer has a diskette drive. Diskettes can only hold up to 1.44MB (megabytes) of data, which isn't large enough for many of today's biggest files.

Infrared. This is an extremely rare option, and it only works if both PCs have infrared capabilities. The benefit is you don't need to worry about setting up cables or selecting a storage medium to make the transfer.

Internet. If sharing the files through a physical medium such as a diskette or a cable isn't practical, you can try sending the files through the Internet, usually by an e-mail attachment. This is an easy method for transferring a few files, but downloads can be slow without a broadband connection or during peak Internet usage times.

Network connection. If both computers between which you want to share the files are already connected via a network, sharing the files is extremely easy. (Setting up a network just to copy a few files between computers might be overkill, though.)

Recordable CDs. If your computer is equipped with a CD-R (CD-recordable) or CD-RW (CD-rewriteable) drive, you can create a CD containing up to 650MB of data. The destination computer then only needs a CD-ROM drive to read the data, which nearly all computers have available. (The data can be read by nearly any optical drive, including CD-RW or DVD-ROM [digital versatile disc, read-only memory].) This probably is the easiest and most cost-effective method currently available for moving large amounts of data.

Zip disks. A Zip disk works in a similar manner to a diskette, and it can hold anywhere between 100MB and 250MB of data per Zip disk. But a Zip disk will only work with an Iomega Zip drive, and not every computer has one available.

Troubleshooting The Move.

One of the above methods of transferring files should work in your situation. And, hopefully, your file transfer will happen without a hitch.

Here are some solutions to problems you may have had during the transfer.

The most common problem you'll find when transferring files is the destination computer is unable to read some or all of the files. One of several problems could exist.

Malfunctioning media. Diskettes can go bad, and compact discs can be scratched, causing the data on them to be unreadable. Many times, the media will seem to be functioning properly while you're copying the file, but the file is unreadable on the other end.

If you have a badly scratched CD, you'll probably need to replace it. If you're using a diskette, try reformatting it. (This process will erase all data on the diskette.) Double-click My Computer and highlight the A: drive. Click File, Format. Click the Start button to begin formatting the diskette. Once the diskette is reformatted, check to see whether the formatting program reports any bad clusters. If so, throw the diskette away.

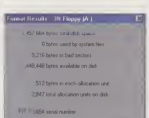
If no bad clusters are found, but reformatting still doesn't work, try using a new diskette to copy the file. It's fairly common for older diskettes to go bad, so if you're using this method for transferring files, make sure you have plenty on hand. If the file still won't transfer properly, try one of the solutions below.

Corrupted file. Some files will be corrupted en route to the destination computer. First, check to make sure the file is readable on the origination computer. If the file itself is OK, try copying the file again. It may make a correct copy the second time. Otherwise, you may need to try a new medium for copying the file. Make sure you aren't doing other tasks on the computer during the file copying to help ensure a smooth transfer.

Lack of software. If the destination computer can't open a data file, make sure the computer has the necessary software installed to read the data file. If both computers have the same software available, make sure both have the same versions. Some files created with a newer version of a program may not be readable by a computer with an older version of the software installed.

To work around this problem, you often can save a file in an older version format (by using the Save As command) to make the file readable by the destination computer.

Replacing a newer file. When moving files between computers, make sure you don't replace a newer version of a data file with an older version (unless you're actually trying to restore the older version). Win98 will usually warn you when it's going to overwrite a file with the same name (unless you click the Yes To All button the first time you are warned). Check the time stamps listed in this warning window to see whether you're going to overwrite a newer version of the file. Then click Yes to overwrite the file and No to cancel the overwriting.



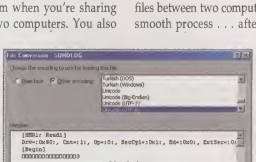
A diskette containing bad sectors could cause file-transfer errors. If your diskette has these errors, throw it away.

Inadvertently overwriting newer files can be a common problem when you're sharing data files between two computers. You also need to make sure your Win98 clock is set to the correct time on both computers, or the time stamps for the files in question might be incorrect.

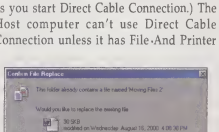
Confusing cable connection. If you are using Win98's Direct Cable Connection to share the files between two computers, you have a few problems.

First, make sure both computers are running Direct Cable Connection properly. Make sure one has been selected as the Host and one as the Guest. (You will make this selection as soon as you start Direct Cable Connection.) The Host computer can't use Direct Cable Connection unless it has File and Printer Sharing For Microsoft Networks installed from the Win98 CD. (If this isn't installed on your computer, Win98 will walk you through the process.)

Next, make sure the cable you've chosen (either parallel or serial) is inserted in the correct ports on the back of both computers. You must use the same type of port (parallel or serial) on both computers. Win98 will search your computer for the types of ports you have available. Many people will choose a parallel port, but you'll probably have to remove your printer connection from the port before beginning to use Direct Cable Connection.



If you try to share files between two computers running different versions of the same software, you might be asked whether you want to convert the file to the newer version.



Check the time stamp in the Confirm File Replace window to determine whether you're accidentally overwriting a newer version of a file, as shown here.

■ **One Final Warning.** Transferring files between two computers usually is a fairly smooth process . . . after the first couple of times. Don't be surprised if you have to use some trial-and-error guessing to pinpoint a problem the first few times you try to share files because so many of the potential problems mimic each other. It also might take you a couple of tries to find the method of file sharing that works best for you.

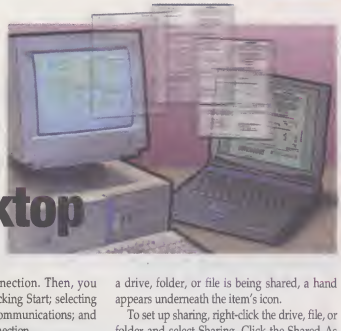
Regardless of which method you select and regardless of whom you're sharing files with, we'd recommend one final precautionary measure: Run updated virus-scanning software on every file you receive from another computer.

Viruses typically are spread between computers by passing diskettes or by attaching themselves to other shared files. Even sharing files between your home computer and your work computer could cause a virus to spread if you aren't running virus-scanning software in both locations. By making sure all files you receive are virus free before you install or open them, you'll be able to relax and reap the benefits of file sharing. LS

by Kyle Schurman

How To . . .

Share Files Between A Notebook & Desktop



The beauty of using both a notebook and a desktop computer is that you're never away from the files you need to work on. Of course, your files will only be within reach if you share them between the two systems.

Windows 98 offers three methods for file sharing between notebook and desktop computers: via a dial-up connection; through a peer-to-peer network connection; or through a feature called DCC (direct cable connection).

With the first method, the notebook user uses a modem and the Windows Dial-Up Networking feature to dial into another computer. That computer can be a dedicated network server or a standalone desktop PC on which the Windows Dial-Up Networking Server feature has been enabled. To use the peer-to-peer method, you'll have to set up a permanent network by installing NICs (network interface cards) on each computer and then running networking cables to a central network connector, or hub.

The DCC method, which is used only when the two computers are close to each other, involves making a connection using either a cable or an infrared connection. Then, you would enable DCC by clicking Start; selecting Programs, Accessories, Communications; and choosing Direct Cable Connection.

Once you've made the connection between the computers, you can share files as long as the systems all "see" one another. You can check this by opening Network Neighborhood on each computer and making sure you see each system listed. (In the case of DCC, only files on the "host" computer can be shared.)

To share files, double-click the Network Neighborhood icon on your Desktop and then double-click the icon for the computer from which you want to access files. If no computers appear in the Network Neighborhood or if the desired files are not available, you can perform two troubleshooting checks that will usually solve the problem. First, check the file sharing, and second, check the resource sharing.

Check File Sharing. For your computers to share files, you must turn on Windows File Sharing. Click the Start button; select Settings, Control Panel; and then double-click the Network icon. Next, select the Configuration file tab and click the File And Print Sharing button that appears in the bottom portion of the window. In the File And Print Sharing window, make sure the I Want To Be Able To Give Others Access To My Files box is checked and click OK.

Check For Shared Resources. A user on one computer can access files on another computer only if those files have been set up as shared. Double-click the My Computer icon on the Desktop of the computer sharing files to check to see which, if any, resources are being shared. You can share the entire hard drive or open it and share only certain files or folders. If a drive, folder, or file is being shared, a hand appears underneath the item's icon.

To set up sharing, right-click the drive, file, or folder and select Sharing. Click the Shared As radio button, assign a name, and select an access type and password if desired.

Network Problems. If file and resource sharing have been enabled for two computers that should be connected, and they still don't appear in each other's Network Neighborhoods, the problem is probably related to the network connection. First, rule out loose physical connections with cables, cards, and power cords. Second, if you are having problems dialing into another company's server, check the settings for your Dial-Up Networking connection and then contact the network administrator for assistance.

If you've made hardware or software changes to your system, and file sharing was working before you made the alterations, disable or uninstall the new items to see if they are causing the conflict. If they are, contact the manufacturer of the new device for assistance.

There also may be problems with the network support or setup in Win98. The Microsoft Knowledge Base (http://support.microsoft.com/support) offers excellent troubleshooting routines that can help diagnose and repair network conflicts. One article in particular, #Q185836, offers information about using the Win98 System File Checker Tool, which automatically verifies no Windows networking files have been damaged or replaced.

If none of these suggestions solves the problem, you can probably blame a defective or inoperative network device. Refer to the documentation that came with your hardware. LS

by Jennifer Farwell

What You Need To Know

Benefits
File sharing makes it simple for telecommuters and mobile professionals to exchange information with the home office and update office files when changes occur.

Time
15 minutes or longer, depending on hardware problems

Easy to Intermediate

Skill Level
Easy to Intermediate

How To . . .

Solve Common Hardware Installation Problems

Adding new hardware to your computer system is usually a hassle-free process. However, there are times when adding that new hard drive can present more problems than you expected.

One major problem users run into when installing hardware is miscommunication between the hardware and the microprocessor, or CPU (central processing unit), so one of the things we'll focus on is understanding how peripherals communicate and how they use your computer's memory and resources. We'll also look at common problems of specific pieces of hardware.

Peripheral Communication. Hardware devices are often called peripheral because they are not essential to the computer's operation and are added to the computer by a computer manufacturer or a user. Examples of peripheral devices include modems, network cards, hard drives, video displays, and printers.

Your computer communicates with peripheral devices in five basic ways. One way is through COM (serial communications) ports. This method can be used by almost any type of device, including modems and mice.

Internal peripheral expansion cards, such as graphic adapters and network cards, use the other four methods of communication: IRQ (interrupt request lines), DMA (direct memory access) channels, I/O (input/output) addresses, and UMBs (upper memory blocks). All of these methods help your CPU determine when the peripheral is allowed to work and which system resources it will use.

Ports. There are four available COM ports: COM1, COM2, COM3, and COM4. Only COM ports 1 and 2 are hardware based. COM ports 3 and 4 are software based and shared by the hardware that supports COM1 and COM2. COM3 is supported by COM1 and COM4 is supported by COM2.

Devices that use serial ports include PDA (personal digital assistant) docking ports, modems, and infrared ports. By default, infrared devices will want to use COM3 or COM4.

Another kind of port, the parallel port, is usually used by external peripherals such as printers. External tape drives, older digital cameras, and some external Iomega removable disk drives also use this communication method.

The USB (Universal Serial Bus) interface is quickly replacing serial and parallel port connection options. USB devices are much speedier. Up to 127 USB devices can be connected through a number of cascaded (or **daisy chained**; where devices are connected to each other in a series) hubs to a single PC-based USB port. This makes system expansion much easier.

A number of USB-based devices now exist, including digital cameras and even USB Ethernet network adapters. Like other devices, the USB controller uses conventional system resources such as IRQs and I/O addresses. We'll discuss specific USB device installation problems later.

IRQ. Interrupt request lines are communications routes within a computer that are reserved for carrying interrupt signals, which tell the CPU to halt its present task and await further instructions. A peripheral sends signals through the IRQ lines to the computer's CPU when it is ready to accept or send information. Each peripheral must send its messages over a specific IRQ. See the sidebar "The IRQ Connection" to see a listing of all 16 IRQs and their common functions.

Many of the 16 IRQ numbers are already tied up. Usually only IRQ 9, 10, 11, and 15 are available, but sometimes they are tied up, too. For example, IRQ 15 may often be used for SCSI (Small Computer System Interface) controllers. If your computer system does not have a second parallel port adapter (LPT2; the circuitry that lets a computer talk with a peripheral, in this case, most likely a printer or external tape drive), IRQ 5 will be available, unless you are using a sound card; they often use IRQ 5.

PCs use 8-bit PIC (programmable interrupt controller) chips to manage the IRQs. Only eight IRQ numbers (0 to 7) were available on the first PCs, but beginning with the 286 class PCs, a second PIC chip was added that uses IRQs 8 and above. IRQ 9 and IRQ 2 are used to link (or cascade) the two chips together.

What You Need To Know

Benefits
Successfully install hardware and avoid common problems

Tools
Philips screwdriver, flathead screwdriver, needle-nose pliers, Internet access for drivers and software patches

Time
2 to 4 hours

Skill Level
Intermediate to Difficult

Because each available IRQ number is supposed to be used by only one peripheral device, you can run into trouble if your computer system has assigned more than one device to an IRQ number. For instance, Windows 95 systems will lock up when two devices sharing the same IRQ try to talk to the microprocessor at the same time.

This type of lockup can easily happen in systems that have peripheral adapter cards that use manual settings. Plug-and-Play adapter cards usually find the right IRQ setting, but if manual settings are used, it's easy to put in an IRQ number that's already taken. We have seen this happen when someone added a SCSI CD-ROM drive and controller to an older Pentium system. Both the video graphics adapter and the CD-ROM drive claimed IRQ 9. The system locked up each time the user tried to access the CD-ROM drive. Assigning the SCSI controller a different IRQ number solved the problem.

Microsoft provides tools users can use to determine which IRQs are free. We'll discuss these later.

Direct memory access. DMA (a means of transferring data from a storage device, such as a hard drive, to memory without passing the information through the processor) channels, the third method of communication, quickly exchange large amounts of data with the main memory (RAM [random-access memory]). Devices such as diskette drives, hard drives, infrared ports, and sound cards make use of DMA channels.

Input/output addresses. The fourth method of communication, I/O addresses, are four-digit hexadecimal numbers. For example, COM1 uses I/O addresses 03F8 to 03FF. Each device must have a unique I/O address, so I/O addresses should not be shared between two different peripheral devices.

Upper memory block. Devices such as video adapter cards and network interface cards use the UMB (the area that contains the 384KB [kilobytes] of memory just above the 640KB of conventional memory) to exchange chunks of data with computer memory. Each device that uses upper memory must use a unique range that is not shared by any other device. Upper memory is divided into 64KB pages, which use hexadecimal addresses. Device drivers usually use this area of memory.

Windows 9x Device Manager.

Communication between the peripherals and the microprocessor is essential to the success of your hardware installation, so you need to know how the existing peripherals on your machine are communicating before you start installing a new device. A good way to do this in Windows 95/98 is to consult the Device Manager. Here, you can make a detailed printout of all the IRQ numbers, I/O addresses, and DMA channels for each peripheral device in your system, which will tell you which system resources you have already used. This is good preparation for adding a new peripheral device.

First, open the Control Panel by clicking the Start button, selecting Settings, and choosing Control Panel. From the Control Panel, open System, then click the Device Manager tab and highlight Computer. Click the Print button at the bottom of the dialog box. You should then select the All Devices And System Summary Option.

Once you install a new device, the Device Manager can tell you if the hardware is working properly. The Device Manager lets you view devices by type or by its connection. By default, the detailed View Devices By Type option is selected.

If there is a red X through the device, you know the system has not recognized it. If there is an exclamation mark inside a yellow circle, you may be dealing with bad hardware settings, or you may be in need of driver updates. To get more information about the device, you can right-click the device and choose Print from the pop-up menu to get a detailed report about the problem peripheral.

When you double-click the malfunctioning device you will see the device's Properties window. The General tab's Device Status box will tell you the nature of the problem. You can then click the Settings, Driver, or Resources tabs to make corrections.

Depending on the hardware characteristics, the Settings tab will provide you with information about the current settings. The Driver tab will show you if the device drivers are operating correctly. If you are prompted to update them, you can do so through a diskette or a CD or by downloading the update from the Internet if you're running Win98. The Resources tab contains the I/O address settings, the IRQ number, and the upper memory address ranges, if used. The Conflicting Device List box will show which peripherals have conflicting settings. You should look at the Use Automatic Settings checkbox. If it's been unchecked, you'll want to check the box and then restart Windows to see if the problem is corrected.

If you have to use manual settings, uncheck the box, and you will be able to select unused

The IRQ Connection

Hardware communicates with the computer over IRQ (interrupt request lines), using them to send and receive information. There are only 16 IRQ numbers, and you can assign each number only one peripheral at a time. Here are the numbers and their common functions.

IRQ	Type Of Bus Slot	Standard Function
0	None	System timer
1	None	Keyboard controller
2	None	Second IRQ controller (to enable IRQs 8-15)
3	8/16 bit	COM port 2 (or COM 4, if installed/enabled)
4	8/16 bit	COM port 1 (or COM 3, if installed/enabled)
5	8/16 bit	Parallel port (LPT2; varies widely)
6	8/16 bit	Diskette drive controller
7	8/16 bit	Primary parallel port (LPT1)
8	None	Real-time clock
9	8/16 bit	Available (redirected IRQ 2)
10	16 bit	Available
11	16 bit	Available
12	16 bit	PS/2 mouse port (if installed/enabled)
13	None	Math coprocessor
14	16 bit	Hard drive controller
15	16 bit	Available

resources that may solve the conflict problem. This can get a little tricky, so you'll want to consult the support Web site for the device that's giving you problems for further information:

New Device, Old Windows.

Once you determine how the devices in your machine are connected, you're ready to start installing. If you decide to add a new peripheral to an older operating system, you should do your homework before you buy the new gadget. At the least, you should expect to visit the manufacturer's Web site to download a new device driver that works with your PC's operating system. However, you may be in for a lot more work.

This is especially true if you're considering upgrading an older system by adding a USB adapter. There are several hurdles you're going to have to overcome.

First, you will need to ask your PC manufacturer if the BIOS (Basic Input/Output System) can be upgraded to a newer version that will support USB devices. If so, then you'll have to check your operating system.

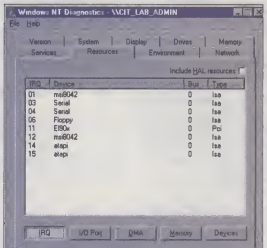
If you're using Win95, you should upgrade to at least Win98 SE (Second Edition). Even though USB adapters were technically supported under Windows OSR 2.1, USB adapter manufacturers such as Belkin have not written device drivers for Win95, so you'll have to upgrade to Win98. If you're using Windows NT, you should upgrade to Windows 2000.

Installation Specifics.

Now you know how peripherals communicate and where to check for possible hardware conflicts, but that's only half way up the hill. You may encounter problems that are specific to the device you are installing. We'll cover a few common peripherals and try to walk you through any problems you may encounter.

USB Devices. USB devices are designed to be easy to install, so you shouldn't have many problems with them. Occasionally, though, you will run into a few glitches. If you start seeing duplicate entries in Device Manager for a recently added USB device that is malfunctioning, you should check the USB vendor for device firmware updates. You may also have to update your computer's BIOS, as well. This is reportedly a common problem with USB modems and printers.

USB cables can also cause problems. These cables come in high-speed and low-speed versions. The high-speed USB cables are better shielded. If you encounter problems with a low-speed USB device that is at the end of a long USB chain, try replacing the low-speed cables with a high-speed cable.



The Windows NT Diagnostics dialog box provides no-frills information about your system configuration. Shown here are the hardware IRQs (interrupt request lines) this NT Workstation is using.

Use powered USB hubs whenever possible. Cascading a number of unpowered hubs can lower the power being supplied to the USB devices. The low voltage can cause a number of unpredictable results.

Hard drive. If you're using an older version of Win95, you will also be limited in how large you can set hard drive partitions for newer hard drives. The original Win95 will only accept partitions as large as 2GB (gigabytes). If you upgrade to a later version of Windows before you add an additional hard drive, you'll be able to use all of the drive as a single partition if you want.

The Windows 98 Drive Converter (FAT32) utility can help you make use of the drive. Find it by clicking Start, Programs, Accessories, System Tools.

Zip drive. If you're adding an internal ATAPI (Advanced Technology Attachment Packet Interface) Iomega Zip drive to a system, you may find that the CD-ROM drive has been installed on the secondary IDE (Integrated Drive Electronics) controller as a master IDE unit.

Iomega Zip drives usually come with a special IDE ribbon cable. You might want to put the Zip drive in place of the CD-ROM drive and move the CD-ROM drive to the primary IDE controller ribbon cable. When you do this, be sure to change the CD-ROM drive to an IDE slave unit.

Occasionally, you'll run across a system that doesn't like to have the IDE hard drive and CD-ROM drive located on the same IDE controller. When this happens, you can use the Iomega drive and cable with the system's hard drive. Be sure to set the Zip drive as an IDE slave unit.

If you already have a Microsoft Intellimouse Pro mouse installed, you may get the error message "ASPI for Win32 not initialized." This is caused on Win95 /98/NT systems by the MsWheel application or a botched attempt by the Iomega setup program.

When this happens, you'll have to uninstall the Iomega software and delete any related files found in the TEMP folder. In addition, you should check the IOSUBSYS folder for any files that are zero bytes long and erase them. Next, you will have to stop the MsWheel application and then reinstall the Iomega software. Detailed instructions for this procedure can be found at the Iomega support site (http://www.iomega.com/support/documents/10056.html).

Modems. After adding a new high-speed modem, users frequently complain it doesn't live up to its peak speeds. This problem usually has less to do with the quality of the modem and more to do with the quality of service provided by the local telephone company.

However, if you do believe you have a modem problem, you can look in the Modems Properties dialog box for answers. Click Start, Settings, Control Panel and then click Modems. Then click the Diagnostics tab in the Modems Properties dialog box. From there, click the Help button to open the Windows 98 Troubleshooters window. Use the information here to help you work through a number of problems.

Another thing to watch for when installing a modem is that you don't use a serial device on COM1 and then tell the modem to use COM3. Remember that COM3 and COM4 are actually software using the COM1and COM2 hardware. This means you can't simultaneously use COM1 and COM3 or COM2 and COM4. You can attempt to work around this problem by assigning a different IRQ number to COM3 or COM4, if possible.

Installing a new hardware device isn't all that difficult once you understand how each device communicates with the computer and each other. This information should keep all of your devices working together happily. LS

by Bill Hayes

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RAM	64 MB	64 MB	64 MB	64 MB
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DVD-ROM	6X	6X	6X	6X
Modem	56k/v.90	56k/v.90	56k/v.90	56k/v.90
3.5" Drive	Yes	Yes	Yes	Yes
Free Internet	No	No	No	Yes
Price	$3499	$3297	$2848	$1999

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How To . . .

Solve Port Conflicts & Problems

These days, when people talk about their computers "being connected," they're probably talking about the Internet. However, PC connections have long meant much more than just being a part of the online world.

On the back of your computer are various places to connect your hardware peripherals' cables. These connections are known as ports, which your computer uses to send and receive data. In the "old days" (the 1980s), serial ports, which have a small 9-pin connector, were mostly used for external modems, printers, and mice. These days, serial ports are still used for external modems and mice, but they're also used for transferring information to and from PalmPilots and other handheld computers.

Parallel ports, on the other hand, have a wide 25-pin connector and are used for printers, scanners, external CD-ROM drives, external hard drives, external Iomega Zip and Jaz drives, and many other external add-on devices. Most computers made in the past couple years also come with two or more USB (Universal Serial Bus) ports, which are narrow rectangular slots. USB ports are becoming more and more popular for all devices, mainly because they are fast, easy to use, and relatively problem-free. Many computers also come with round 6-pin ports for the keyboard and mouse in order to keep the serial port free for other uses.

The difference between serial and parallel ports is that a serial port sends and receives information 1 bit at a time, like soldiers in a single file. A parallel port, in contrast, sends and receives 8 bits at a time, in parallel on eight wires, like an eight-lane freeway. You have both types of ports because some devices, such as modems, need information in a single stream. Also, because of electrical reasons, serial cables can be much longer than parallel cables, so if the distance between a computer and a peripheral is more than 15 feet, a serial connection will work better.

What You Need To Know

Benefits
Resolve device conflicts so you can get your new hardware peripherals working

Time
A few minutes to an hour

Skill Level
Easy to Intermediate

Cost
Free, unless you need new parts or a new cable or if you have to take your computer in to be tested

Conflicts & Natural Forces. The biggest problems that occur with ports are system conflicts, according to Oscar Hernandez of Einstein Computers in Los Angeles. This usually happens when you add a new expansion card (an add-on electronic circuit board that gives a computer new abilities; expansion cards are used to connect devices such as modems, sound cards, and graphics cards to a PC) or device to your system. You may have followed the manufacturer's guidelines for physical installation exactly, including letting Windows 98 automatically find a driver (a piece of software that lets the peripheral device and the computer communicate) for installing the new device. If things suddenly aren't working as they should be, the new device probably has caused problems with IRQs (interrupt request lines).

IRQs are communications routes within a computer reserved for carrying interrupt signals, which tell the CPU (central processing unit) to halt its current task and await further instructions. Different computer components, such as modems, keyboards, mice, sound cards, and other devices, each have a special IRQ set aside for them to use.

Your computer's motherboard controls the flow of information among all your devices and the CPU. To keep the traffic flow orderly, the CPU, working with the operating system, allows for up to 16 IRQs, which are numbered zero through 15. Problems occur when, for example, your new internal modem wants to use the same IRQ as another device; one or the other then won't work.

Win98 is supposed to monitor and adjust for such things, but it can't automatically resolve all these problems, in part because not all third-party hardware necessarily works as smoothly as intended. In addition, some devices require certain IRQs. With the proliferation of devices, such as video cameras, extra hard drives, and CD-RW (compact disc-rewriteable) drives, people often find themselves short of IRQs.

Another port problem, according to Computer Telecommunications Systems, is caused by electrical surges due to lightning. An electrical surge can cause a port to fail; in that case, you may have to replace the port, if not the whole computer. If you are in a lightning-prone area, you should unplug both power cords and phone lines when lightning storms are occurring.

Troubleshooting Port Problems. If you are having a port problem, you first have to isolate the problem area. First, decide if it's a spontaneous problem or if it has occurred after installing a new device. If it's a spontaneous problem it could be one of the following: something has gone wrong with the port, such as with a lightning strike; the hardware connected to the port may be having problems, such as a printer being out of ink; or, you may have a cable problem that is as simple as the cable becoming unplugged.

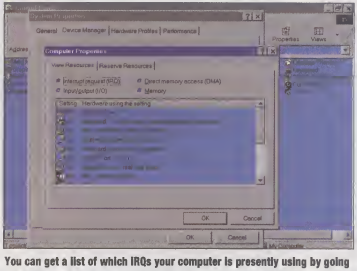
If a problem has developed after you've added a peripheral or new port, then you could have a number of other problems, such as a bad or wrong cable, a bad port, a bad piece of hardware, trouble with software or driver, or a system conflict that is related to an IRQ problem.

Solutions. As you can see, port problems can get complex. Always check the simplest solutions first, such as ensuring your cables are firmly connected and making sure your printer has ink if your printer isn't working. If you have a new printer that isn't working, it may not be a port problem. Newer printers communicate much more with your computer, which means you need a bidirectional cable. Make sure you have a bidirectional cable because although a "standard" cable will fit, it won't do the job.

If you have more than one serial or parallel port, make sure the device that isn't working is connected to the correct port. Try switching the device to another port.

Determining whether a port itself is bad can be difficult. If you have another device, such as a printer, that you know works, try connecting that to the port to see if it works. There are also software and hardware tools available for checking if a port is functioning, but you may get more peace of mind from taking your computer to a repair shop to have it tested.

The easiest way to avoid system conflicts in the first place is to use USB devices. You can plug in a USB device while the computer is still on (a technique known as **hot-plugging**) and Win98 will immediately recognize the device. If buying a USB device is not an option, and you suspect the port itself is fine, then it's time to investigate whether you have an IRQ problem. Click the Start button, select Settings, click Control Panel, double-click System, and then click the tab marked Device Manager.



You can get a list of which IRQs your computer is presently using by going to the System Properties window, highlighting Computer, and then clicking the Properties button.

You will see a list of categories that describe the types of devices you have connected to your computer. Click the plus sign next to a device category to see specifically what you have. In particular, click the plus sign next to Ports. Anything marked "COM" is a serial port and anything marked "LPT" is a parallel port. If there is an exclamation point in a yellow circle next to any one of the specific ports, there is a system conflict. Anything with a red X means the port has been disabled.

Disabling a port or modem. Hernandez says the single biggest conflict comes from installing a new internal modem. An internal modem is a serial (COM) port and modem combination. Your computer may already have an internal modem built-in to the motherboard. You may not be able to remove that modem, but you can disable it and free up the IRQ for your new board.

To disable a device, double-click it from the system properties window, and the properties window for that device will appear. Select the General tab, click the box next to Disable In This Hardware Profile, and click OK.

Resolving A System Conflict. If one of your ports in the Systems Properties window has an exclamation point, double-click it and click the tab marked Resources. You will then see various information, including the IRQ number. If there is a conflict, the area at the bottom of the window named Conflicting Device List will explain which device is causing the problems. Because Windows has not resolved the issue in its automatic installation, you may need to manually change the IRQ.

At this point, you're getting into dicey territory. You now know there is a conflict, but you should probably get some assistance in resolving it. We do not recommend that you start changing IRQs without help because you may make the problem worse by causing conflicts with other devices that are working fine. You can call the technical support line for the device you just installed or the technical support line for the computer's manufacturer. An expert can then lead you through changing the IRQs.

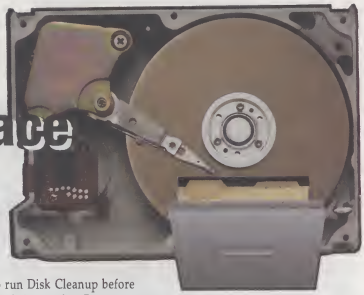
Before you call, you may want to find out which, if any, IRQs are available. To see all your IRQs, go back to the Systems Properties window and double-click Computer at the top of the list. Then, click the Properties button. You will then see a list of all your IRQ assignments. The numbers that are not being used are your available IRQ settings.

If every number is used, you're full. However, some devices can share an IRQ if the devices are not used at the same time. Also, you can attach parallel port devices to each other to form a **daisy chain**. The first component connects to the computer, the second component connects to the first, and so on. Signals are passed from the computer to the first device and on through the line. To limit confusion, each device is given a different priority to use the channel to which they are all connected or they transmit information only when they "hear" that the line is clear. This eliminates disorder and conflicting requests. This is an option you can discuss with the technical support expert. LS

by Christopher Meeks

How To . . .

Create More Hard Drive Space



Every minute you operate your computer, there's a race being run. It's a competition to see what will run out first: your computer's ability to keep up with changing technology or the storage capacity of your hard drive. More often than not, your hard drive wins. Eventually, most users see the message of impending doom: "You've run out of disk space."

Fortunately, there are a few tricks to lengthen the life of your hard drive. Some of them won't even cost you a dime.

Hard Drive Organization. If you have Windows 98, the "Out Of Disk Space" message will ask if you want to run a built-in hard drive housekeeper, Disk Cleanup. To free some space, it scans your hard drive looking for unneeded program files, Internet cache files, and other temporary files you don't need.

If you want to run Disk Cleanup before space runs out, click Start, select Programs, Accessories, System Tools, and Disk Cleanup. Select the drive you want to clean from the scrollable list and click OK. Disk Cleanup will tally up how much space it can clear for you. You'll also see a list of items that Disk Cleanup typically looks for: Temporary Internet Files, Downloaded Program Files, Recycle Bin, Temporary Files, and Delete Windows 98 Uninstall Information. Select each item to see how much space it occupies.

You probably won't miss the temporary or Recycle Bin files. If you want to check exactly what you will be deleting, click the View Files button (available only through Internet Temporary Files, Recycle Bin, and Downloaded Program Files). The downloaded program files are merely mini programs that you might download off the Internet to view high-tech Web pages. You can always download them again if you need to. Your Win98 uninstall information, however, is something you can't get back. Deleting these files will give you a substantial amount of room; just be sure you never intend to return to a previous version of Windows.

When you've made your selections, click the OK button. Disk Cleanup asks if you are sure you want to delete the files. If so, click Yes. Disk Cleanup shows its progress through a red-dotted line and closes itself when it is finished.

To keep your hard drive free from this waste, you can schedule Win98 to run Disk Cleanup on a regular basis. Click Start, select Programs, Accessories, System Tools, and click Maintenance Wizard. Select the Express option and Win98 will run a cleanup utility, ScanDisk, and Disk Defragmenter on a regular basis. Select the Custom option to determine which of the programs you want it to run and when.

Reclaim Ailing Sectors. We recommend that you also run ScanDisk when you run Disk Cleanup. This program not only improves the performance of your hard drive, it also can help you reclaim some space. When ScanDisk checks how files are allocated, it also looks for portions of the hard drive that the operating system marked as questionable. If errors have occurred, Win98 often puts up its own yellow tape around the area and doesn't allow the drive to use that portion, even though the area might still be usable. ScanDisk can inspect the area and decide if it should be permanently marked as a bad sector, or fix the problem and reopen the sector for use.

Click Start, select Programs, Accessories, System Tools, and click ScanDisk. In the window that opens, select the drive you want to scan, and run the Thorough test so ScanDisk looks at the hard drive for errors. Also, click the Automatically fix errors option so that ScanDisk takes care of any problems that might arise, and then click Start. The program might take 30 minutes or several hours, depending on how often you run ScanDisk and how big of a hard drive you are checking. When ScanDisk is finished, it will display its findings. Click Close twice to exit the report and ScanDisk.

Hiring A Housekeeper. Although Disk Cleanup is a handy tool to help you

What You Need To Know

Benefits
Free up more space on your hard drive

Tools
Optional tools include uninstaller, compression, and utility programs, as well as storage media and online storage sites

Time
1 hour to more than 12 hours, depending on number of methods used, size of drive, and condition of drive

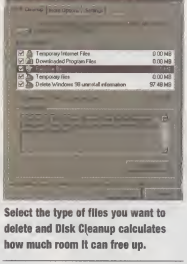
Skill Level
Easy to Difficult, depending on method

Cost
$$$ Free to more than $400, depending on options chosen

unload some of the junk you've accumulated, it's like any free help. It does the job, but not necessarily as well as a professional. If you want to hire a professional hard drive housekeeper, check out these cleanup utilities that look for many of the same things as Disk Cleanup, but more efficiently. In addition, they look for and suggest many other extras that Disk Cleanup overlooks.

One of our favorite cleanup utilities is Norton CleanSweep by Symantec ($39.95; 800/441-7234, 408/253-9600; http://www.symantec.com). Norton CleanSweep found 160**KB** (**kilobytes**, one equals about one thousand bytes) of space that Disk Cleanup missed. The Internet portion helps you uninstall programs or plug-ins you inadvertently downloaded while viewing Web pages. It found tons of cookie files to get rid of and even listed the Web sites where they came from, which we didn't see in the other programs. You can restore uninstalled programs, archive and compress infrequently used files, make a compressed backup of important programs, or move a program to another location or computer. CleanSweep also can find duplicate files, uncover orphaned files left behind by deleted programs, and locate files that are not often used.

Another favorite is McAfee UnInstaller 6.0 by Network Associates ($19.95; 800/338-8754, 972/308-9960; http://store.mcafee.com). When you first install the program, you go through a Customization Interview to mark files that should never be deleted. To uninstall programs, UnInstaller monitors your system as you install programs to help you later uninstall them. UnInstaller found about 1MB (megabyte) of stuff that Disk Cleanup missed. When we wanted an even bigger cleanup, we asked SpaceMaker or PowerClean to suggest old files to delete. UnInstaller can also move and transport files and programs to another computer and make backups of deleted files.



Select the type of files you want to delete and Disk Cleanup calculates how much room it can free up.

■ **Discard The Junk.** Once you've rid your system of some temporary files and other disposable files, you have a little room to work without getting another "out of space" error message. Now you can personally delete any extra programs or files you don't need. Click Start, Settings, the Control Panel and double-click Add/Remove Programs. In the Add/Remove Programs window, you will see a scrollable list of many of the applications you've installed on your computer. To delete one, click its name and the Add/Remove button. Windows will ask if you are sure; click Yes if you are. UnInstallShield removes all the components it can from your drive. If anything is left, click the Details button to find out what parts remain. You may have to remove them yourself. When it's finished, click OK.

To find other items to delete, you can look for fonts and clip art located in your word processor folder. In addition, open the WINDOWS folder and delete any items in its COOKIES subfolder. Cookie files left behind to track your Web usage are probably unnecessary. Plus, don't forget to delete sound or video files you no longer need. Some might be located in a DOWNLOAD subfolder in your Web browser's folder.

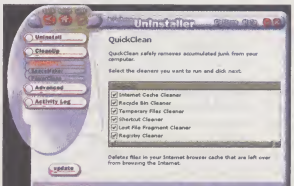
■ **Cleaning Windows.** As you probably know by now, the idea is to get rid of all the excess baggage you never use. Another place you can try to do this is within Windows itself. You might be able to gain several megabytes of space by getting rid of extras you don't need.

Open Add/Remove Programs again from the Control Panel. Click the Windows Setup tab so it comes to the forefront. Here, you'll see a list of several Windows components. Components currently installed on your computer will appear with a check mark next to them. You will also see how much space they take up on the right side of the window. To select a component, click the component so it is highlighted. (Components with shaded boxes do not have all of their options installed.) If you want to see all the pieces of a component, click the Details button to display another list of items under each component.

Some components are inescapable; some you may never use. Take, for example, the Accessibility component. When this box is checked, you can tweak your keyboard, sound, mouse, and display to accommodate you if you have an impairment. These can be extremely helpful features, but no all users need them.

Then again, there are certain programs you don't ever want to consider deleting. The utilities Win98 labels as Accessories, such as your Imaging and Paint applications, are examples of this. If you delete these graphics applications, you'll have problems displaying some files. And you definitely don't want to get rid of your Communications components or Internet Tools components if you browse the Internet.

To delete a component, click the checkbox so that the check mark disappears. You will see how much space you are reclaiming listed in red in the window, along with how much space the Windows components consume and how much space is available on the drive. When you are finished, click OK.


UnInstaller
QuickClean
QuickClean safely removes accumulated junk from your computer.
Select the cleaners you want to run and click next.
Internet Cache Cleaner
Recycle Bin Cleaner
Temporary Files Cleaner
Shortcut Cleaner
Lost File Fragment Cleaner
Registry Cleaner
Deletes files in your Internet browser cache that are left over from browsing the Internet.
update
McAfee on the Web

McAfee Uninstaller 6.0 from Networks Associates offers three cleanup levels for a "deeper" clean.

■ **Compress Files, Expand Storage.** For the biggest storage gains, you can compress your drive so that it appears bigger and files devour less room. Win98 includes a compression utility, DriveSpace 3. You can compress the entire drive or part of the drive. Moreover, you can choose to what degree you want to compress the drive. Choose Standard for a moderate compression without a huge speed decrease, HiPack for high compression with a loss of speed, or UltraPack for the greatest compression and biggest system slowdown.

Before you begin, take note that DriveSpace 3 can work with drives as big as 2GB (gigabytes, one equals about one billion bytes), but cannot work with drives that use the FAT32 file allocation table system. (To see which FAT your drives use, start the Drive Converter utility located in System Tools. Click Next until you reach your drive list. Win98 will indicate which system each drive uses. Then click Cancel to stop Drive Converter.) Also, you should always make a backup copy of your files before you make any major drive changes.

To run DriveSpace 3, click Start, Programs, Accessories, System Tools, and select DriveSpace. In the window that opens, select the drive you want to compress. (You can even use DriveSpace to compress your diskettes.) Select the Drive menu at the top of the window and click the Compress option. A new window will open displaying how much space is available before compression and how much free space will be available after compression. To adjust how much the drive will compress from Standard to UltraPack, select the Advanced menu and click OK. Next, click Start.

As the program compresses your drive, it will create a new drive letter for uncompressed data as a host drive. The compression program can take several hours, and you can't run any other programs at the same time. When DriveSpace is finished, it might prompt you to restart your computer.

If you find that after you've compressed your drive, you still run out of space, you can further fine-tune how your drive is compressed. Select the Compression Agent from Start, Programs, Accessories, and System Tools. Click Settings in the Compression Agent window to convert to a greater compression method.

■ **Archive It.** If you don't want to delete a file or compress it, your only other alternative is to store it in another location. You can always archive files to diskettes, but they only hold 1.44MB of data. Another solution is to compress your files, or compress the diskettes. You could run DriveSpace 3 and select your diskette drive as the target drive. But by doing so, you'll only be able to open these files on computers that support Win98 and DriveSpace 3.

You can purchase a compression program to compress your individual files and more efficiently save them to a diskette. You can compress files using a wizard feature in WinZip 8.0 from WinZip Computing ($29; 860/429-3539; http://www.winzip.com). If you are willing to pay $49, you can purchase the WinZip Self-Extractor 2.1 Personal Edition that lets you archive files that extract themselves, without requiring you to stop and extract them before you can open them. Visit the Web site to download a free evaluation version.

Enlist an online storage service to save important files for you. Sites such as MySpace.com offer up to 300MB (megabytes) of free storage.

Another solution is to fork out a little money and purchase a removable media drive. You might consider an Iomega Zip drive (800/697-8833, 801/332-1000; http://www.iomega.com) with 100MB or 250MB disks or an Imation SuperDisk drive (888/466-3456, 651/704-4000; http://www.imation.com) with 120MB disks. The drives cost about $90 to $120 each, and the individual disks cost about $10 to $17 a piece. Zip disks and SuperDisks are ideal for storing all the files you create or download from the Internet, so you can use your hard drive entirely for storing and running your applications.

For a little more space and performance for your dollar, consider an ORB drive from Castlewood Systems (925/461-5500, http://www.castlewood.com). These drives cost about $140 and can store 2.2GB of information on $27 disks. Another option is a Jaz drive from Iomega. They cost about $310 and can store 2GB of information on a $100 disk. Not only do you get bigger capacities, but these drives can transfer data so quickly that they can support video and all sorts of multimedia applications. This means that you could even store an application or two on an ORB or Jaz disk and run the program straight from the disk, bypassing your hard drive altogether.

In addition, all sorts of storage options are available online. Enlist the help of a storage service and you can upload your files to store them online. For example, you can get free storage at locations such as MySpace.com (http://www.myspace.com) or Driveway (http://www.driveway.com) and gain more as you refer other users. These services are free, but you might have to give them additional information about yourself for marketing purposes and fill out surveys.

You will pay from $99 a year for 100MB to $299 a year for 500MB at @Backup (http://www.atbackup.com) or $6.95 a month for 100MB at BackupMyStuff (http://www.backupmystuff.com). Although you have to pay for storage at these locations, you get extra options, such as the ability to schedule backups. The advantage of online storage is that you can access your stuff from other computers with Internet access. The downside is that you have to download your files when you want to access them. In addition, 100MB of storage is not necessarily a lot of storage.

■ **Add Them Up For The Win.** Once you've tried the tricks we've suggested, you can also attempt a few last-ditch efforts to reclaim more space. For example, you can adjust the size of your Recycle Bin so that it reserves less room for itself and gives you more room for your files. (Right-click the Recycle Bin and adjust the percentages accordingly.) You can also convert your computer to use the FAT32 file allocation method through Win98's built-in Drive Converter utility to save data more efficiently to drive clusters and free up some more space. (Remember, however, that DriveSpace 3 doesn't work with FAT32.)

Combined, these ideas will hopefully allow your computer to outgrow its usefulness before your hard drive outgrows its space. LS

by Cindy Krushenisky

How To . . .

Make Your Hard Drive Run More Efficiently

Hard drives are one of the biggest performance bottlenecks PCs face. Nearly every component of the PC constantly looks to the hard drive for information. The fact that modern drives still rely on mechanical technology instead of 100% electronic components means they suffer from physical limitations that hardware, such RAM (random-access memory) and processors don't have to worry about. That's why it's so important to keep your hard drive running at peak efficiency.

Fortunately Windows comes with several tools for managing your hard drive, letting you solve many performance woes with minimum fuss. There are a few aspects of hard drive management that are better left to third-party applications, but you can save yourself a lot of money and achieve significant performance boosts by beginning with the hard drive's basic settings and working your way up from there.

What You Need To Know

Benefits
Depending upon the function, you may see a speedier hard drive, quicker access to applications, more efficient use of hard drive space, and enhanced virtual memory

Time
5 minutes to several hours

Skill Level
Easy to Intermediate

Essential Settings. The first thing to check is the hard drive File System Properties page, accessed by right-clicking My Computer, clicking Properties, selecting the Performance tab, and clicking the File System button. Select the Hard Disk tab and make sure the Typical Role Of This Computer drop-down box matches your computer's configuration (laptop, desktop, or docking station PC). You'll notice that the screenshot we took contains an entry for CacheMan Optimization. CacheMan is a freeware program from Outer Technologies that uses proprietary techniques to optimize Windows' virtual memory settings, which we will discuss later in this article.

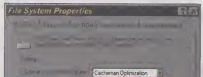
The File System Properties box also contains a Read-Ahead Optimization slider, which uses system RAM to preload information from the hard drive that is likely to be accessed by other system components. If the other components can access the data directly from RAM, overall system performance improves. We always leave the slider on Full and recommend that you do the same if your computer has 32MB (megabytes) or more of RAM.

Another setting you'll want to enable if your computer supports it is DMA (direct memory access). Normally data takes a path from the hard drive to the CPU (central processing unit) to the system RAM (and vice versa). DMA bypasses the CPU, letting the drive and the RAM communicate more directly and efficiently. Enabling DMA on a drive, including CD-ROM and DVD-ROM drives, that supports the technology can dramatically reduce the stuttering and pauses computer users experience while playing games or working with large, complex files.

To enable DMA, right-click My Computer, click Properties, and select the Device Manager tab. Expand the Hard Disk Controllers entry and double-click the icon that corresponds to your hard drive (likely labeled GENERIC IDE DISK TYPE 01). Choose the Settings tab and check the DMA box if it isn't already checked. Click OK and reboot the computer. To see if the setting was enabled, follow the above steps to get back to the Settings page for your hard drive and see if the DMA box is still checked. If it is, your computer and hard drive were designed to work with DMA, and you should notice an appreciable performance leap during intensive hard drive access. If the box isn't checked, DMA is not available for that hard drive.

Defragging. Another fast, free method for keeping your hard drive running smoothly is to defrag it regularly. As programs are added to and removed from the computer, bits of files get scattered all over the surface of the hard drive. If the drive heads that read data have to move all over looking for the scattered data, programs begin to stutter and run more slowly. The solution is to pack all of the stray data into one contiguous area of the hard drive so the drive heads don't have to move as much. This is what defragging does. Windows 98 users get the added benefit of Intel optimization software that intelligently places the files you access most often close together and also can keep most of the data for a program, such as all of the files required by Adobe Photoshop, close together.

Windows 95/98 (Win9x) comes with a built-in defragging tool, which you can launch by clicking Start, Programs, Accessories, System Tools, and Disk Defragmenter. A drop-down list lets you select which drives you want to defrag, and you can click the Settings button to access some advanced options. The Settings page is where you enable the Intel software in Win98, and you can also have the Disk Defragmenter look for hard drive errors. We don't recommend this latter option unless your hard drive is crashing unexpectedly, as it adds a lot of time to the defrag process.



It's important to tell Windows what type of computer it's running on if you want to keep your hard drive running efficiently.

Click OK to apply the settings but don't click OK in the Select Drive window yet. First, shut down all of the extra programs that are running on your PC, including your Internet connection and antivirus software. If there are any icons showing in the System Tray (except the yellow speaker icon), you'll need to close the programs associated with them before running the Disk Defragmenter. In some cases you may need to press CTRL-ALT-DELETE one time only and manually select a program by clicking its name in the Close Program list and clicking End Task. If you are unable to close all of your other programs, they may write new data to the hard drive and force the defragmenter to stop and start over from the beginning.

Even if you can't shut down all of the other programs, click OK to run the Disk Defragmenter. You can watch the program at work by clicking the Show Details button, but don't launch any other programs while the defragmenter is running. Wait until the process is completely finished before rebooting the computer or doing any other work. We recommend running the Disk Defragmenter every month or so.

Tweaking The Cache. Every computer user has opened several programs at once or accessed a large file and watched as their system slowed to a crawl. Usually what's happening is there isn't enough RAM to store all of the data you are working with, and your hard drive is being pressed into service as temporary RAM (called virtual memory or the swap file). Hard drives, which are not designed to fill this role, operate hundreds of times more slowly than physical RAM chips so performance suffers and your drive chatters endlessly.

The best solution is to add more memory to your computer so it can handle the work you're throwing at it, but there are a few tricks you can use to make your virtual memory run more efficiently. If you only have one hard drive installed on your computer, defrag it, then access you virtual memory setting. Right-click the My Computer icon, click Properties, choose the Performance tab, and click the Virtual Memory button. The virtual memory page shows which drive holds the virtual memory cache (usually C:), the minimum amount of space permanently reserved on the drive for the cache, and the maximum amount of space the virtual memory can grow to.

The default settings are set to a 0MB Minimum and No Maximum, but we've found that creating a permanent swap file provides better overall hard drive and system performance. The trick is to set the Minimum and Maximum values to the same setting, so the swap file establishes a permanent chunk of hard drive real estate for itself that the drive heads can access more efficiently.

To do this, choose the radio button for Let Me Specify My Own Virtual Memory Settings to make the Minimum and Maximum boxes editable. The number you enter in the boxes depends on how much free hard drive space you have available and how large your hard drive is, but we recommend a value between 200MB and 500MB. The value listed in the Hard Disk drop-down box will tell you how much free space is available on your hard drive.

When the values match, click OK and reboot your computer to create the permanent swap file. The file will appear in your C: directory as WIN386.SWP. You also may want to look into a third-party cache management tool, such as CacheMan (http://www.outertech.com), that optimizes the swap file based on the way you use your computer.

If you have two hard drives that both run at comparable speeds (check the documentation that came with them to see if this is true), we recommend parking your swap file on the second hard drive and installing the applications you use most often on the primary hard drive. This can boost performance because the C: drive can serve up programs while the D: drive, running independently, can provide the swap file they need. To do this, use the Hard Disk drop-down box on the Virtual Memory page to select your second hard drive, and then enter the Minimum and Maximum values as described above. Note that this trick only works if you have two separate hard drives on your computer, not just one hard drive that is divided into two or more partitions that have their own drive letters. Partitions do provide other benefits that are described later in this article.

Disk Compression. Win9x comes with a utility called DriveSpace that can nearly double the available space on your hard drive by using compression technology. These algorithms crunch binary data so it

Comparison Of Cluster Sizes Between Files In FAT16 & FAT32

Partition Size	Cluster Size	
	FAT16	FAT32
Less than 127MB	2KB	N/A
128MB to 255MB	4KB	N/A
256MB to 511MB	8KB	N/A
512MB to 1,023MB	16KB	4KB
1GB to 2GB	32KB	4KB
2GB to 8GB	N/A	4KB
8GB to16GB	N/A	8KB
16GB to 32GB	N/A	16KB
More than 32GB	N/A	32KB

SOURCE: MICROSOFT WINDOWS 98 RESOURCE KIT

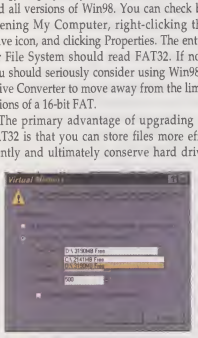
The problem with partitions is that they are easy to create but difficult to reverse.

takes up far less space, but the problem is that your system has to reconstitute the data to its original binary state each time the data is accessed. The system then has to recompress the data after it is no longer in use.

This process takes time, and running files from a compressed drive leads to enormous performance hits. If you need more hard drive space, consider purchasing a second hard drive or investing in backup equipment, such as a CD-R (compact disc-recordable) drive or an Iomega Zip drive. Avoid compressing your entire hard drive because you will not be able to play games and your office applications will run sluggishly. You can still use normal compression utilities, such as WinZIP to compress individual applications and files, but stay away from DriveSpace and similar tools that put the squeeze on your entire hard drive.

■ **Upgrading To FAT32.** If you have an older PC that came with Win95, it's likely your hard drive was formatted with FAT16 (16-bit file allocation table) technology instead of the superior FAT32 (32-bit) technology employed by the last release of Win95 and all versions of Win98. You can check by opening My Computer, right-clicking the drive icon, and clicking Properties. The entry for File System should read FAT32. If not, you should seriously consider using Win98's Drive Converter to move away from the limitations of a 16-bit FAT.

The primary advantage of upgrading to FAT32 is that you can store files more efficiently and ultimately conserve hard drive space. Files take up a minimum amount of room on the hard drive (called a cluster) regardless of their actual size, and that cluster size depends on the FAT Windows uses. Smaller clusters are more efficient. FAT16, for example, can only address drives that are 2GB (gigabytes) or smaller. A 2GB drive that uses FAT16 has 32KB (kilobyte) clusters, while that same 2GB drive formatted with FAT32 has 4KB clusters. If you have 10 4KB files on the FAT16 drive they will eat up one cluster each, for a total of 320KB. Those same 10 files on the FAT32 drive still require one cluster each, but 10 4KB clusters add up to an efficient 40KB. To get 4KB clusters under FAT16 you would have to chop the drive up into several 255MB chunks called partitions (discussed in the next section). See the chart comparing the cluster size for various file sizes between FAT16 and FAT32.

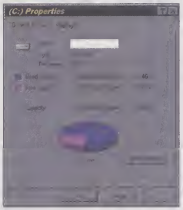


Here we're setting up a permanent 500MB swap file on our second hard drive to help increase the speed and efficiency of the primary drive.

Obviously it's easier to manage one 2GB hard drive than eight 255MB partitions, so the easiest thing to do is upgrade the entire drive to FAT32. Before starting, there are a few considerations. WinNT can't recognize drives that use the format, so if you run Win9x and WinNT on the same machine, you're better off with a FAT16 drive. Also, the FAT32 conversion process is irreversible unless you use third-party software to undo the changes. We recommend PowerQuest's PartitionMagic (http://www.powerquest.com). This indispensable utility will let you take total control of your hard drive, including easily reverting to FAT16 if the upgrade isn't working out.

Even if you have a program, such as PartitionMagic, be certain to back up your hard drive, or at least important files, in case something goes awry during the conversion. Shut down all of the programs running on your PC, and when you're set, click Start, expand Programs, Accessories, and System Tools and click Drive Converter (FAT32). Read the introductory information that appears and follow the prompts to carry out the conversion.

The All Hard Drives option should always be selected when you're defragging.



Check Drive Properties to see if your drive is formatted for FAT32.

■ **How To Delete Partitions.** As we mentioned, you can divide hard drives into separate sections called partitions that can have some performance benefits. When you partition a drive, the new sections all get their own drive letter, and Windows thinks of them as separate hard drives. For example, you can divide a 10GB hard drive so it has a 6GB partition and two 2GB partitions. If you only have one hard drive (and most people do), the first partition is labeled C:, and the other partitions can have any available drive letter you assign to them, such as D: or H:. Some manufacturers ship their computer systems with hard drives that already are divided into partitions. Many power users create their own partitions to split drives up and keep cluster sizes small.

The problem with partitions is that they are easy to create but difficult to reverse. Win9x comes with an archaic utility called FDISK that lets advanced users create partitions easily, but it doesn't have any tools to make it easy to delete a partition without destroying the data in it. That's why tools such as PartitionMagic are so important. The software lets you add, resize, merge, delete, and perform dozens of other useful operations on system partitions without fear of losing any data. Best of all, it lets you do all this from the comfort of a Windows interface, without having to learn any abstruse commands. If you plan on working with partitions at all, PartitionMagic and similar programs are an excellent investment. LS

by Tracy Baker

How To . . .

Make Your New Drive Use All Its Available Space

When you bought your Windows 95 PC, you probably didn't think you would ever fill your 2GB (gigabyte) hard drive. However, a few years later, it is full of files and programs you can't part with. You consider the possibility of buying a new PC with more space, but you decide to go with the cheaper option: purchasing a new hard drive.

You follow the drive manufacturer's instructions to install the new drive. However, when you attempt to **partition** (divide up the space on a disk into smaller units) the new drive, you discover you can't use all your hard drive space. Don't worry, that space is still there. The problem could be a hardware-related issue or because of the operating system's file system, and there are solutions to either problem.

What You Need To Know

Benefits
The ability to use all the space on your hard drive

Tools
Philips screwdriver, flathead screwdriver, needle-nose pliers, Internet access, and a BIOS (Basic Input/Output System) update, if needed

Time
4 or more hours

Intermediate to Difficult

Skill Level
Intermediate to Difficult

$$$

Cost
$109 (Windows 98 SE)

BIOS Problems. While trying to partition a hard drive that is larger than 8GB, you may find you can only set up an 8GB partition. Modifications to the BIOS interrupt 13 software, which is used to access hard drives, cause this problem. These changes were necessary in order to read drives larger than 8GB. You will see these changes referred to as **interrupt 13 extensions**.

You should definitely contact your PC vendor for a BIOS (Basic Input/Output System) upgrade if the BIOS is dated earlier than 1998. If you have a custom-built PC, and you're not sure what company the BIOS is from, check the following sites for BIOS upgrades:

- Micro Firmware (http://www.firmware.com)
- Phoenix (http://www.phoenix.com/pcuser/bios/bios.html)
- Unicore Software (http://www.unicore.com/biosupgrades/upgradenow.cfm)

If you still need more help, turn to Microsoft. It maintains a listing of third-party hardware and software vendors. Its listings are current as of the first quarter of 2000. You can find this listing in three knowledge base articles at the Microsoft TechNet Web site (http://www.microsoft.com/technet). Look up articles Q65416 (Vendors A-K), Q60781 (Vendors L-P) and Q60782 (Vendors Q-Z).

FAT Problems. If, when attempting to partition your new drive, you discover you can only partition the drive for 2GB, you are probably using the original version of Win95 or Win95 SP1 (Service Pack 1). These operating systems use a file storage system that can only access logical drive volumes that are no larger than 2GB. This 16-bit file storage system is called **FAT16 (file allocation table 16)**.

The basic unit for storing data on a hard drive is the **byte**, which comprises 7 or 8 **bits** (the smallest units of computer storage). In a simple text file, a number or letter would take up a single byte. File systems arrange bytes in groups called clusters. A **cluster** is a unit of storage that is also known as an allocation unit.

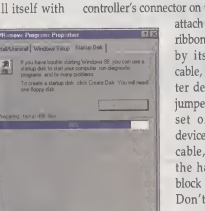
FAT16 allows only 65,525 clusters for each drive volume. The maximum allowable size for a cluster is 32KB (kilobytes). This limits the volume size to 2GB. Under FAT16, a single cluster in a 2GB hard drive would be set up to hold 32KB. If your file on a hard drive were 33KB, it would have to use two clusters. This would waste 31KB because the second cluster would not be able to use this space.

So FAT16 not only limits the size of the drive but also wastes the space it uses. Fortunately, with later versions of Windows, there is a much better alternative. It's **FAT32**, and it is a 32-bit file allocation table. FAT32 is available with Win95 editions later than OSR 2 (Original Equipment Manufacturer's Service Release 2), Windows 98, and Windows Me.

The conversion. Before you can transfer the contents of your smaller drive to the larger one, both drives must be using FAT32. You need to upgrade your system to Win98 SE (Second Edition). The upgrade edition is available for

$109 from Microsoft's Web site. You should install Win98 to the hard drive you're presently using. To do this, you need 260MB (megabytes) of free drive space.

By default, Win98 will install itself with FAT16. After you install the updated edition, you will want to run the Drive Converter (FAT32) Wizard, which you can open by clicking the Start menu, Programs, Accessories, System Tools, and then Drive Converter (FAT32). This wizard will examine your system for potential software incompatibilities and then start the conversion process. The first portion of the conversion takes place in Windows and then your system restarts under MS-DOS mode while the FAT16 clusters are converted to FAT32 clusters. Be sure to turn off your screen saver before starting the conversion process.


Add/Remove Programs Properties
Install/Uninstall
Windows Setup
Startup Disk
If you have trouble starting Windows 98, you can use a startup disk to start your computer, run diagnostic programs, and fix many problems.
To create a startup disk, click Create Disk. You will need one floppy disk.
Create Disk...
Preparing blank 4MB disk...
OK

Use the Windows 98 Startup Disk to partition your new hard drive and format it to its full size.

Then the Driver Converter restarts Win98 and loads the Disk Defragmenter. This program reorganizes your hard drive so all the free space is together. This may take several hours, depending on the amount of memory you have in your system and your processor's speed. After the conversion is complete, you'll discover your programs will run faster, and you'll have recovered a large amount of space.

■ **Create A Startup Disk.** Now, you're ready to get the new hard drive set up. First, you'll want to create a Win98 SE Startup Disk. To create a Startup Disk, open the Start menu, click Settings, and select Control Panel. Double-click the Add/Remove Programs icon. In the Add/Remove Programs dialog box, click the Startup Disk tab. Insert a blank formatted diskette into your diskette drive and then click the Create Disk button. (You may need your Win98 SE installation CD-ROM to create the disk.)

■ **Connect The Second Drive.** If you have not already added the second hard drive to your system, it's time to do so. Make sure the computer is off and remove the computer's power cord from the wall outlet. Right now, you will just want to connect your new drive to your PC; you don't need to fully install it.

If you have a hard drive and a CD-ROM drive, you're most likely using both of these on the primary IDE (Integrated Drive Electronics) Controller. Locate the secondary controller's connector on the motherboard and attach the new hard drive's ribbon cable to it. If it's all by itself on the ribbon cable, you make it the master device by moving the jumper block to the correct set of pins. If another device is already using the cable, make sure you set the hard drive's jumper block to the slave position. Don't forget to plug the power supply's connector in, as well. (*NOTE: Consult your hard drive's installation manual for detailed, full installation instructions. These are not complete instructions.*)

■ **Format The New Drive.** When you finish the installation, start the computer with the Startup Disk in your diskette drive. After you have an A: prompt, type **fdisk** and press ENTER to set the partition for the second hard drive.

When the FDISK program begins, you'll see the following menu items:

1. Create DOS partition or Logical DOS Drive
2. Set active partition
3. Delete partition or Logical DOS Drive
4. Display partition information
5. Change current fixed disk drive

Item five will be available only if you have two or more hard drives in your computer. Type the number **5** and then press the ENTER key. This choice will tell the FDISK program to apply these changes to your new drive. For the sake of this article, we're assuming you have only two hard drives in the computer.

Now select item one, Create DOS Partition Or Logical DOS Drive. Then, choose item two, Create Extended DOS Partition, so the next drive letter will be correctly chosen. By default, the size of the partition is the size of the drive. Press the ENTER key to select this number and then press the ESC key. You should see the following message: All Available Space In The Extended DOS Partition Is Assigned To Local Drives.

Press the ESC key again to exit the FDISK program. You'll then need to restart your PC. Keep the Startup Disk in the diskette drive. When you again see an A: prompt, type **format d:** and press ENTER. (This assumes the new drive is drive D:; change the drive letter to the appropriate drive for your system.) The drive will then be formatted to its full capacity.

If you'd rather format the new drive in Windows, restart Windows, double-click the My Computer icon on your Desktop, and right-click the new drive's icon. Select the Format option from the pop-up menu. When presented with the format menu, ensure the drive's full size is shown in the Capacity field, and select the Full radio button before clicking Start.

■ **Transfer The Data.** After you successfully format the drive, you can transfer the contents of the old drive to the new drive using the MS-DOS XCOPY command. If you formatted the new drive in Windows, you'll need to restart the PC with the Startup Disk in Drive A:.

From the A: prompt, type **xcopy c: d: /s /e /h /c /k /r** and press ENTER. This command copies the contents of drive C: to drive D: (change the drive letters to match your drive letters). To copy all subdirectories, the /s option is used. The /e option copies even empty subdirectories. The /h option copies all hidden files. In the event of an error, the /c option tells XCOPY to continue anyway. To ensure that all file attributes are correctly set, the /k option copies all file attributes rather than resetting them. Finally, the /r option lets XCOPY write over read-only files that somehow might have gotten onto drive D:.

■ **Install Your New Drive.** After XCOPY finishes, you can turn off the computer. Now, disconnect drive C: and put the new drive in its place. Make sure you have the drive jumper block set to the Master setting if you plan to only use the new hard drive.

Turn on the computer again with the Startup Diskette in Drive A:. At the A: prompt, start FDISK again. Select option two, Select The Active Partition, to turn the drive's extended DOS partition into the active DOS partition that's used to boot up the computer. After you make the selection, exit the FDISK program and restart the computer.

You will once again be working in Windows, but you'll be enjoying the experience with a much bigger hard drive. LS

by Bill Hayes

How To . . .

Set Up Master/Slave Drive Relationships

The time has come; you need to add more storage space to your PC. One option is to add a second hard drive to your system. To do this, you need to set up a master/slave relationship between your two hard drives.

Master & Slave. First, you need to understand what a master/slave relationship is. The most common storage interface on a computer for hard drives is **IDE/EIDE (Integrated Drive Electronics/Enhanced Integrated Drive Electronics)**. Most IDE/EIDE systems come with two controllers, both of which let you connect two drives to it. If you have only one drive on your system, it will be set to be the master drive. The master drive contains the startup files, and it is usually labeled, or has a partition labeled, C:. When you add a second drive to your system, you will have control issues between the two drives. If the two drives are set on the same controller, one has to be set to slave, which the master drive will control. *(NOTE: Before you begin, make sure you're completely ready to do the job. Read this article and the manual that came with your new hard drive completely.)*

Pre-Setup. Before you start, you will want to do several things to make sure the process goes smoothly. First, carefully read all documentation that came with the drive. Get a clear idea in your head of the steps involved in the process. (All drives will differ.) You also need to back up any important files on your present hard drive, or better yet, the entire drive. In addition, make a Startup Disk so you can boot the system even if both drives go down.

Next, make sure the system power is off and unplug the system. Sketch the interior of the computer around the drives and connectors so you can reassemble everything more easily later. Check to see that you have a free bay for the new drive and decide which drive you want to be the master. In general, you'll want to use the fastest drive as the master, which is where you will store your system files.

Jumpers. The plastic **jumpers** (on/off switches) on the back of the drives are what the PC uses to determine which is the slave and which is the master drive. By default, most drives usually come with their jumpers in the master position. However, by placing the jumpers in different positions on the drive, you create a current between specific pins, which let the computer differentiate between a slave and a master drive. Each drive manufacturer has its own jumper configuration, so check your new hard drive's documentation to see how yours is set up. (You also can look to the back of the drive; often, the settings for slave and master will be stamped on the drive.) You can easily move jumpers by gently pulling them out with pliers or tweezers, changing their positions, and pushing them back in.

Installation. Once you set the jumpers, its time to connect the new drive to the system. *(NOTE: To avoid electrostatic discharge, ground yourself when handling drives; touch something metal or wear an electrostatic bracelet. In addition, grip the drive by its sides only; don't touch the circuitry.)* First, figure out how you're going to wire it in. If you're putting it on the same connector as the original drive, see if the cable has an additional plug so the two drives can both plug into it and the motherboard. If it doesn't have an additional plug, replace the cable with one that came with the new drive or plug the new drive into the second connector. (Trace the first drive back to where it plugs into the PC; the second connector should be close by.) When plugging the cable into the drive, make sure they come together correctly. Check your documentation for specifics, but the red edge/line on the cable should probably line up with the #1 pin on the drive. *(NOTE: It doesn't matter what order two drives are in on a connector. The jumpers determine which is the master and which is the slave.)*

Attach the drive to your PC's power supply, (if there aren't empty cables coming off it, you can purchase a Y splitter at a PC store), making sure the cable correctly lines up with the drive (one edge of the connector should be rounded). Attach the drive securely in the empty bay. Then, check your hard drive's documentation for instructions on how to configure the CMOS (complementary metal-oxide semiconductor) and BIOS (Basic Input/Output System) and how to format the drive. Drives will usually come with utilities for making these tasks easier.

You can find additional documentation, downloads, and tech support by visiting the hard drive manufacturer's Web site. LS

by Rich Gray

What You Need To Know

Benefits
Increase your storage options and provide a handy localized backup option.

Tools
Pliers/tweezers, screwdriver/wrench, and an electrostatic bracelet

Time
1 to 2 hours on average

Skill Level
Intermediate

Cost
$$$ Free once you have the drives, unless you need cables. These vary in price, but shouldn't cost more than a few dollars

How To . . .

Fix Speakers

Your speakers may sit innocently on the desktop next to your computer, but that certainly does not guarantee that they work properly or even that they work at all. If you suffer from sassy or sickly speakers, keep on reading. We have a few sound suggestions that just might give your speakers back their song.

Truthfully, though, most of your audio troubles probably have little or nothing to do with the condition of your speakers. You may initially blame a lack of sound or distorted sound on your set of speakers, but be aware that your sound card or various settings within Windows 98 are most likely the real culprits. Thus, the first step is to properly diagnose the problem, using the process of elimination to zero in on the faulty source.

Silent Speakers. Silence is golden, but *not* when it involves your speakers. If you hear no sound when you play a sound clip or run a game that you know includes sound effects, your first challenge is to determine whether the problem is with your speakers. Do this by simply grabbing a pair of headphones and plugging it into the jack in your sound card at the back of your computer. If you hear audio through the headphones, it's a safe bet that your speakers are to blame.

Next, plug your speakers back in and make sure the connection is tight. Also, note carefully which jack you plug them into. Many sound cards also contain jacks for microphones, MIDI (Musical Instrument Digital Interface) devices, and joysticks. If you mistakenly plug your speakers into one of these jacks, don't expect to hear any sound.

Not only must your speakers plug into the appropriate jack on your sound card, you also might have to plug them into a power source. If your speakers require AC power or battery power to amplify the sound, they won't work without it. Do your speakers have a small light on the front of one of them when the power is switched on? This may be an indication that they use electricity. Furthermore, many electrically powered speakers also allow you to control the volume through a small slider or knob on the front of the unit.

Odd as it may seem, some speakers that appear to need electricity actually do not. If all else fails, try unplugging them and turning off the power switch. Certain speakers, when powered down, will then begin working like a set of headphones. The only difference is that you won't be able to control the volume from the speakers anymore; you'll have to use the volume control features in Win98 instead.

Finally, it is possible that an intermediary device is causing the disappearance of your sound. If you use a y-splitter to connect both the speakers and a secondary device to the same sound card jack, try removing the splitter and the other device. If your speakers then work, you can assume that some kind of interference from the other device was interrupting the sound signals.

One Quiet Speaker. The only thing more puzzling than a total lack of sound is having a working speaker paired with a silent speaker. This phenomenon could be the result of an incorrect balance setting between the two speakers. Find out by clicking Start, Programs, Accessories, Entertainment, and then Volume Control. Double-clicking the speaker icon on the right end of the Taskbar also opens the Volume Control window.

Within the Volume Control window, look for the horizontal slider bar in the Volume Control section (usually the upper left corner). This slider controls the speaker balance, and as you might suspect, the pointer should be in the middle of the bar for optimum balance.

If this doesn't solve your single silent speaker problem, make sure the cable connection to both speakers is tight. Verify that each speaker is receiving electricity (if it is needed). It could

What You Need To Know

Benefits
Improved performance of speakers

Tools
Headphones (to help you determine the source of the problem)

Time
5 to 30 minutes, depending on what you are trying to fix

Skill Level
Easy to Intermediate

You can solve many speaker problems by simply reducing the volume. If you can't control the volume with a knob or slider on the front of your speakers, you'll need to visit the Volume Control window.

be that one speaker is not plugged in or has a dead battery.

Finally, if you are using stereo speakers, are you using stereo plugs? If one speaker isn't working, it could be that you are using mono plugs instead of stereo plugs.

For Poor Sound Quality. Just because you have two speakers emitting sound doesn't necessarily mean that the sound is enjoyable. If you have reason to believe that your sound quality can be improved upon, you have a few options. Here again, bad sound might be caused by a sound card or some other type of error, but it still never hurts to check some of the settings in Win98 that pertain to speakers.

You can troubleshoot several audio problems by checking the various settings within the Multimedia Properties dialog box.

Access the Multimedia Properties dialog box to verify that your system is set up for the speaker configuration you're using. From Start, select Settings, Control Panel, and then double-click Multimedia. Under the Audio tab, click the Advanced Properties button below Playback. On the Speakers tab of the Advanced Audio Properties window, click the arrow key next to the Speaker Setup field. From the drop-down menu, select the type of speaker setup you are using. Options include quadraphonic, monitor mounted, laptop, desktop, and more. If the Speaker Setup field contains a speaker setup other than the one you are using, your audio output may suffer. Make your choice, and then click Apply and OK.

Interference. Interference of various sorts can wreak havoc on a set of speakers, causing distorted sound and general aggravation on your part. The most likely source is RF (radio frequency) interference, especially if your speakers are amplified. This is because the cables running from the speakers to the sound card have a greater tendency to pick up radio interference. Solve or at least minimize the problem by using shorter cables. If you must use longer cables, try coiling them and securing the loop to limit the amount of loose cabling.

Another possibility is that you are getting interference from your monitor (although usually it is the other way around). Cheap or unshielded speakers can cause electronic interference with your monitor, creating moiré, or on-screen patterns of moving distortion. Repositioning the speakers or moving them away from the monitor and other peripherals might eliminate your interference problems. If you still experience the effects of interference, check your local electronics store for products such as ferrite beads or RF chokers that help block radio frequency interference.

Trouble With Stereo Speakers. Stereo speakers may offer substantially more audio appeal, but they also come with a few significant disadvantages. The large magnets found in stereo speakers don't mix well with your monitor, your hard drive, or any diskettes laying nearby. Most smaller, self-powered computer speakers come with some form of magnetic shielding, such as insulation or specially reinforced casing. Unfortunately, most stereo speakers lack this vital magnetic protection. Should you opt for stereo sound regardless of the inherent drawbacks, make sure that you place the speakers at least a few feet away from your monitor and computer.

Furthermore, you will find that some stereo speakers simply do not work with a PC. That's because the average sound card sends a much weaker signal to the speakers than a stereo would send. Because of the weaker signal, normal computer speakers must produce more power in order to properly amplify the sound. Stereo speakers may or may not have adequate power to compensate for the weaker signal they receive from the sound card.

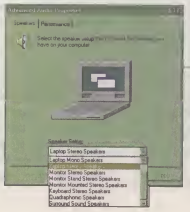
With Snap, Crackle & Pop. It is not uncommon for speakers to sometimes emit a popping sound when you turn your computer on or off. Although this popping might be annoying and sound damaging, it probably is not harming your speakers. It may be that the volume setting for the speakers is too high, enabling you to hear the popping sounds whenever electricity is suddenly added to or removed from the speakers. If you can, you also might try turning your speakers off just before shutting down the computer, and then turning them back on right after starting the computer up.

If your speakers emit a low humming or whining sound, you might simply have the volume set too high. You also might have a microphone sitting too close to the speakers. If you use a microphone to record sounds, do not place it near either speaker as this may cause a feedback problem whenever the microphone picks up a sound.

For speakers that crackle or produce static noises, often the best solution is to reduce the volume settings. Additionally, it never hurts to double-check whether you have your speakers plugged into the correct jack on the sound card. If your sound card has more than one jack, you could easily plug the speakers into the wrong one, especially if it is difficult to see the back of your computer. For amplified speakers, use the Line Out jack on the sound card instead of the Speaker Out jack.

With a little luck, one of these solutions will fix whatever ails your sickly sounding speakers. However, should you still hear the snaps, crackles, pops, or even silence, you will need to check with your speakers' manufacturer for further advice. Also keep in mind that an inexpensive pair of speakers will never produce sound that can compare with that of a higher quality set of speakers. If you've followed these troubleshooting tips and still don't like your speakers' sound quality, perhaps it's time to consider upgrading this component. LS

by Hannah Henry



Use the Advanced Audio Properties dialog box to specify your unique speaker configuration. If you have Laptop Stereo Speakers selected when you are actually using Desktop Stereo Speakers, your sound quality might suffer.

How To . . .

Solve Printing Problems

If your printer produces poor quality output, it's almost as bad as having no printer at all. To improve print quality, you must figure out what is causing the problem. Frequently, output will improve dramatically if you install a new toner or inkjet cartridge. But given the expense of these consumables, it's best to run a few quick tests before replacing any parts.

According to Epson, inkjet cartridges should be changed every six months even if the tanks are not empty. After six months, the ink loses viscosity. Thick ink can clog the jets, causing spotty printing, missing characters, or banding (alternate rows of light and dark colors). Clogging can also occur if the wrong cartridge seals are removed at installation.

What You Need To Know

Benefits

Learn to tweak printer settings affecting print resolution, color brightness, and color contrast. Learn how to unclog blocked ink jets, and where to go to download updated printer drivers.

Tools

The latest printer driver for the printer currently installed on your computer; replacement printer cartridges

Time

Running several cleaning cycles can take from 10 to 30 minutes. Downloading new printer drivers can take as long as 30 minutes if you use a 28.8Kbps modem

Skill Level

Intermediate

Cost

Free, unless you purchase a replacement toner or inkjet cartridge

Epson cartridges typically have yellow tape seals and white labels. Users must remove the yellow tape before inserting the cartridge in the printer. If they remove the white label, the ink in the cartridge will be exposed to air and will thicken, causing print head clogging and possible print head failure. If your Epson ink cartridge is missing its white label, you must replace the cartridge.

Hewlett-Packard's (HP) printer cartridge nozzles also ship with sealing tape that must be removed for the print head to print correctly. In addition, users must verify that the cartridge has a copper-colored electrical contact strip. If this strip is dirty, clean it with a lint-free cotton cloth that has been slightly dampened with water.

Before replacing a printer's ink cartridge, print a test page. (This option can be accessed from the printer's Properties dialog box. Click Start, Settings, and Printers. Right-click the printer you want to test, click Properties, then look for a print test page option.) If gaps appear, or if printed output contains missing characters or white lines, clean the print head. The clean option will also be available in the printer's Properties dialog box. On Epson printers, it's on the Utility tab.

You may have to run the cleaning cycle more than once to unblock a clogged nozzle. If possible, clean only the affected color or black print head to minimize ink waste. After completing a cleaning cycle, reprint a test page to see if the problem has been solved. If not, initiate another cleaning cycle. It may be necessary to perform several cleanings. If after repeated cleanings the nozzles still don't print correctly, it's time to install a new cartridge. It's unnecessary to power off the computer when changing a printer cartridge.

If your printer uses a toner cartridge, banding may result when the cartridge runs low on toner. If you don't have a replacement cartridge on hand, you can occasionally extend the life of an installed toner cartridge by removing it from the printer and shaking it to redistribute the remaining toner. Shaking isn't always an option—you must NOT shake HP Color LaserJet 4500 cartridges, but you should shake HP LaserJet 4M Plus cartridges. Be sure to read cartridge installation directions before you initiate a shake-up. When it's time to install a new cartridge, remove the protective strip that prevents the toner from spilling out, then insert the cartridge. If any toner spills inside the printer during installation, wipe it up with a slightly damp paper towel.

Missing Letter Portions. When only parts of characters print, check the obvious. Do you have the correct printer driver installed? Have you cleaned the print head to remove clogging? Have you calibrated the printer (aligned the print head)? To calibrate an inkjet printer, access the printer's Utility tab located in the printer's Properties dialog box. Click the Print Head alignment icon to print a test page and choose the right alignment setting. Printer calibration may not be an option with a laser printer.

Dull Colors. Colors displayed on your monitor don't always match the colors output by your printer. That's because monitors and printers use different technologies to represent colors. To improve printer output so that it

aligns more closely with monitor display, experiment with different color matching options. For example, choose Image Color Matching for Windows 9x rather than the default color matching scheme selected by your printer driver.

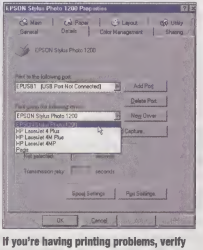
Color printers frequently provide several color adjustment modes to modify settings for brightness (to make images lighter or darker), contrast (to increase or decrease the intensity of light and dark areas), and saturation (to increase or decrease the vividness of document colors). You may also be able to fine-tune the amount of ink your printer uses for the individual cyan, magenta, and yellow colors to adjust a document's color balance as a result.

Dull laser printer output may be the result of something HP calls EconoMode. On HP printers, EconoMode is a setting that substantially reduces the amount of toner fused on the printed page. It significantly extends the life of a toner cartridge by lightening the printed image. Output, while readable, resembles draft mode quality on dot matrix printers. For best-looking print results, it's best to turn off EconoMode or its equivalent.

Print resolution (specified in dpi or dots per inch) will also affect the quality of a printout. The higher the resolution, the better the output quality and the brighter the output colors. This is true for color inkjet and laser printer output as well as for grayscale inkjet and laser printer output. Typically, you can set print resolution from the Print dialog box that pops up when you issue a print command. Click the Properties button in the Print dialog box, and then explore the options available on the various printer driver tabs. You can also fine-tune additional color management settings to adjust how light and dark objects print on the page.

For example, to adjust print settings on an Epson color inkjet printer, click Print, Properties, click the Main tab, then Custom in the Mode section, and then click Advanced. Verify that you are printing to the correct Media Type (such as plain paper, ink jet paper, photo quality ink jet paper, photo quality glossy film, etc.). Choose a Print Quality from the Print Quality drop down list. Photo (1,440dpi) prints the most slowly, but it offers the best results.

Experiment with different Color Management options. For example, if you select Color Adjustment in the Color Management section, you can optimize color matching and enhancement. For the Epson Stylus Photo 1200, color adjustment modes include Automatic, Photorealistic, Vivid, or no Color Adjustment. Choose PhotoEnhance3 in the Color Management section of the Advanced dialog box to correct and enhance photo image quality. Choose ICM when printing scanned photos or computer images. ICM automatically matches printout colors with the colors displayed on your computer monitor.



If you're having printing problems, verify that you've installed the correct printer driver. If you haven't, find and install it.

On laser printers, print quality can also be affected by the condition of the printer's transfer drum or fuser. Poor image quality will result if the printer uses the transfer drum beyond its standard life expectancy. Consult the manual to determine the life expectancy of your printer's fuser. If you've exceeded the estimated number of pages, have a technician replace the transfer drum.

Missing Entire Portions Of Documents.

A printer will print correctly only if you've installed the correct driver. When just a part of your document prints, it could be a driver issue. To determine if you have the correct driver installed, click Start, Settings, and Printers. Right-click the printer with the driver you want to verify, select Properties from the context menu, click the Details tab in the printer's Properties dialog box, then verify that the correct driver is selected in the Print using the following driver drop-down menu. If the field displays an incorrect driver, click the arrow to the right of the field, then select the correct driver from the drop-down list. If the correct driver is not on the list, click Cancel, then reinstall the printer software. If the correct driver is listed in the field, click OK.

Even if the correct printer driver is installed, it's best to visit the printer manufacturer's Web site regularly to see if new printer drivers have been released. If there are new drivers available at the Support site, download them to your computer, then install them. Newer drivers may work more efficiently with your operating system or the software installed on your computer.

If you're using the most up-to-date printer driver and only part of your document prints, it may be because your printer lacks sufficient memory. Try printing a smaller document from the same program or copy a section of the document currently on the desktop and print only the selected portion. If the smaller document or the selected section prints correctly, the original document that you tried to print may be too large for your printer's memory. To correct the problem, you will have to install more printer RAM (random-access memory), if possible.

General Troubleshooting Tips.

When you issue a Print command and nothing happens, or the document prints from the "wrong" printer, verify that the printer you want to use is set as the Default printer. Click Start, Settings, Printers. Make sure there is a check mark next to the printer you want to use in the Printer Control Panel. If not, right-click the desired printer, then choose Set As Default from the context menu.

Banding can result if you use the wrong paper. For example, HP says thin, horizontal streaks or lines may be visible in the color or black fill areas of a greeting card if the card isn't printed on HP inkjet Greeting Card Paper. Banding may also result if the printer's paper thickness lever is in the wrong position, the wrong printer driver is installed, or there is a conflict with the existing video driver. Visit the Web site of your video card manufacturer to see if there is an updated video driver available. If so, download it, and then follow the installation directions.

If the printer won't print in either black or color, the ink cartridge may be dry or you may have incorrectly powered off the printer. When turning off the printer, always use the printer's power button. If you shut down from the power strip, the print head may not position correctly at shut down, causing a malfunction the next time you try to print.

If you have problems with the printer connected to the parallel pass-through port of a scanner, Zip drive, or other external device, try connecting the printer directly to the computer. Pass-through connectors may prevent the printer from communicating with the computer. LS

by Carol S. Holzberg, Ph.D.

How To . . .

Troubleshoot A PC That Won't Recognize A Printer

Hardware
Windows cannot print due to a problem with the
Try one or more of the following:
* Check the printer by printing a test page from
* Make sure the printer is turned on and online.
* Reinstall the printer driver.
OK

You buy a printer, bring it home, and install it. But now, when you try to print, you get a message informing you that the computer does not recognize your printer. What now?

Your computer might fail to recognize a printer at other times besides when you're installing a new one. Various things can cause this problem, and when and why it happens varies. It can happen when you print from some programs but not others, or it can happen after you've printed glitch-free for as long as you've had the printer and your operating system. Fortunately, there's probably a simple solution.

Making It Work. Check the cable and power supply. The cable should be firmly connected to your printer and computer, the power cord plugged in, and the printer turned on.

Check the printer manual to see what kind of cable you need. Often when you've added a new printer, having the wrong cable causes the problem. Many of today's printers require a bidirectional IEEE-1284-compatible data cable in order for the printer and computer to talk to one another. If you've got the wrong cable, that could explain why your computer doesn't know your printer is there.

Make sure the cable is connected directly to the computer, not to pass-through devices, such as scanners and Zip drives, which have printer ports. The problem is that these devices don't support bidirectional communication.

Uninstall your old printer, especially if you're replacing an inkjet printer. Even though you've physically removed your old printer from your computer, its software may be preventing another printer from using the port. Click Start, Settings, Printers. Right-click the icon for the printer you want to remove and then click Delete. If you're prompted to remove all the printer's files, click Yes.

Install the correct printer driver. The printer driver is software that enables your printer and computer to communicate. Windows has drivers for many makes and models of printers; you'll see them listed as you work through the Add Printer Wizard. If your printer isn't listed, Windows will give you the option of installing the driver from a disc provided with your printer. A third option is to download a driver from the manufacturer's Web site. This is often the best method, as you can be sure of getting the latest driver this way. Newer operating systems, such as Windows 98 or 2000, will not work properly with older printer drivers.

Make sure the computer is configured correctly. From the Start menu, choose Settings, Printers. Right-click the printer icon and then click Properties. Verify that the properties are set according to the printer manufacturer's specifications. Also check the port setting. If your printer is connected to the computer's LPT1 port and the port setting is for LPT2, the two machines can't communicate.

If your problem occurred with a printer you've been using successfully, uninstall and reinstall the printer driver. This will solve the problem if for some reason the printer driver files installed on your computer have become corrupted. Click Start, Settings, Printers. Right-click the printer you want to remove, and then click Delete. If you're prompted to remove all the printer's files, click Yes. Double-click Add Printer, and then follow the instructions in the Add Printer Wizard.

If your problem occurred after upgrading to Win98, you need to modify the Win.ini file. This isn't as hairy as it sounds. From the Start menu, choose Find and then click Files or Folders. Type win.ini in the Named box, and click Find Now. Right-click Win.ini in the list and click Properties. Click the Read-only box to remove the check mark. Exit the Find window, and restart your computer to activate the new setting. Then install the printer driver.

You'll find additional performance tips and solutions to other printer-related Win98 problems at the Microsoft Web site (http://www.microsoft.com). Also, check the printer manufacturer's Web site for FAQs and support. LS

by Leanna Skarnulis

What You Need To Know

Benefits
Learn to solve problems that can make your computer fail to recognize a printer.

Time
From 1 minute to check a loose cable to about 1 hour for more complicated scenarios

Skill Level
Easy to Intermediate

Cost
$$$ About $30 if the solution requires a new cable

How To . . .

Fix Common Mouse Problems

The mouse seems like such a simple device. Many computer users take it for granted until it breaks, and they realize just how much they need it for even the most mundane computing tasks. These tasks make the mouse the peripheral device most likely to suffer from wear and tear as it spins around its little mouse pad. You can readily solve many mouse problems through cleaning or adjustments to the software that controls the mouse.

What You Need To Know

Benefits
Keeping your mouse clean and in prime working condition will save you time, frustration, and potential system problems.

Tools
Compressed air, electronics-grade contact cleaner, rubbing alcohol

Time
5 to 10 minutes for most of these tasks

Easy to Intermediate

Skill Level
Easy to Intermediate

$$$

Cost
Minimal. The cost of products to clean the mouse generally runs a few dollars

Bits & Pieces.

As simple in design as the mouse is, there are several small parts that make up the whole, and these parts can cause problems.

Cleaning mouse. No matter how hard you try to keep your work area clean, your mouse is going to find and collect dirt, dust, hair . . . you name it, and your mouse will eat it. Jerky or sputtering pointer behavior or a pointer that only moves up or down or left or right are classic symptoms of a mouse in need of a cleaning. Performing the following steps on a regular basis will help keep your mouse working smoothly.

1. Shut down your computer.
2. Remove the ball. On the underside of the mouse, follow the arrows to turn the ring holding the ball in place, then turn the mouse over and let the ball and ring fall out. Wash the ball thoroughly in warm, soapy water, then dry it with a lint-free cloth or let it air dry.
3. Blow dust out of the mouse. Keep a small can of compressed air on hand for this purpose; we'd hate to see you get lightheaded.
4. Clean the mouse rollers. On the inside of the mouse, you'll see a system of three rollers that are notorious for collecting gunk and slowing down your mouse. If there's a large build-up on the rollers, scrape it off with a toothpick or paper clip or use a cotton swab dipped in rubbing alcohol.
5. Reassemble the mouse, boot your computer, and test your handiwork.

Making contact. If your mouse's buttons don't seem to be working properly (such as rough clicking or double-clicks that result in quadruple-clicks), the inner workings of the mouse could be causing the problem. Shut down the computer, unplug the computer and the mouse from the system, take the mouse apart just as you did when cleaning it, and spray a little electronics-grade contact cleaner (check your local computer supply store) onto the contacts and switches inside the mouse, depressing the buttons several times to work the cleaner in.

Cables and connectors. The cable connecting the mouse to your computer is another potential problem area. The periodic yanking, tugging, and dropping of your mouse can potentially damage the cable or the points where it connects to the mouse or your PC card at the back of your computer. If the pointer appears on-screen but doesn't move or moves erratically, or if you get a "Mouse port disabled or mouse not present" message, you should check out your cable and connection points.

Shut down the computer and carefully examine the cable, making sure it isn't frayed or damaged. Make sure the connector is securely plugged into the back of the computer and that no prongs are bent, broken, or otherwise worn. If they are, replace the mouse.

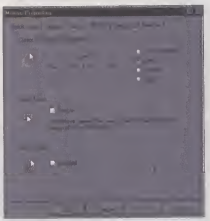
Hardware Conflicts.

Your mouse and the other hardware devices on your system may not always work nicely together. Any hardware conflicts between them will generally make themselves known shortly after installing either the mouse or a new piece of hardware. If your mouse starts to act up, ask yourself if you've installed anything recently.

Many hardware conflicts can be resolved by checking the Web sites of the two conflicting parties and checking for patches, new drivers, or an FAQ that may contain more information on your problem. The odds are

quite good that, if you're having problems, you're not the only one.

A particularly common conflict occurs when two devices try to share the same IRQ (interrupt request lines). (A system pause when you try to move the pointer is one sign of an IRQ problem.) IRQs are pathways on which hardware devices communicate with the CPU (central processing unit). To determine if this is what's ailing your mouse, click the Start button, select Settings, and then click Control Panel. Double-click the System icon, click the Device Manager tab, highlight Computer, and click the Properties button. Selecting the Interrupt Request (IRQ) radio button brings up a list of the hardware on your machine and the setting each device occupies. If your mouse shares a setting with another device, chances are good you've found your conflict. Try solving it by switching IRQs for one of the devices (if possible) or disabling one of the conflicting devices.



The Motion tab of the Mouse Properties dialog box lets you set options for many aspects of pointer movement.

■ **Drivers.** A driver is a program that makes a hardware device work. Because it plays such a big role in mouse operations, a faulty or old driver can affect the way your mouse behaves. Error messages such as, "This pointing device requires a newer version," usually point to a driver problem. You might be able to solve it by reinstalling the driver or installing a newer version.

To check what type or version of driver you have installed, double-click the System icon in the Control Panel, select the Device Manager tab and highlight the mouse installed on your computer. (You may have to click the plus sign [+] in front of the Mouse icon to see your mouse.) Click the Properties button, the Driver tab, and The Driver File Details button to see the location and version of your driver. The Update Driver button will open the Update Device Driver Wizard, which will help you search for updated drivers for your mouse. You can also search your mouse manufacturer's Web site or a site such as DriverGuide .com (http://www.driverguide.com) for a new driver.

■ **Mouse Properties.** If your mouse works fine, but you want to adjust it to fit your work habits better, you can fine-tune its performance in the Mouse Properties dialog box. Click the Start button, select Settings, Control Panel, and then double-click the Mouse icon. The dialog box lets you tinker with many aspects of your mouse settings, including:

(NOTE: The type of mouse you use will affect which tabs you see in this dialog box.)

Quick Setup. The Quick Setup tab lets you easily view your current mouse button setup. You can also place a mouse icon in the Taskbar to easily pull up the Mouse Properties dialog box. If for some reason your mouse settings get screwed up, you can use the Device Setup Wizard (click Device Setup) to return your mouse to its factory recommended settings.

Pointers. This tab lets you select pointer schemes or set specific pointers for different computer functions (busy, etc.).

Buttons. If you want to change what each mouse button does, this is the place to do it. You can also set the double-click timing here. If you find your double-clicks are only appearing as clicks to the computer, try turning down the double-click speed (available through the Options button).

Motion. The Motion tab gives you many options for how your pointer appears and moves on the screen. You can set the pointer speed and the amount of acceleration it has, as well as whether pointer trails appear after it when it moves (and how long such trails will be). If your pointer jumps to the highlighted button of each new dialog box, and you're sick of this, you can shut the feature off (or turn it on) by deselecting or selecting the Smart Move radio button.

Orientation. If the pointer on the screen doesn't correspond with your mouse movements the way you want, you can reset the orientation in this tab. This is a particularly handy function for use with trackballs.

Devices. The Devices tab helps you add new devices and get information on existing ones.

■ **Other Problems.** Sometimes mouse problems aren't always the fault of the mouse. Other factors can contribute to your rodent problems.

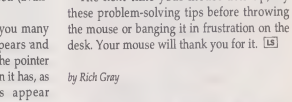
Mouse pads. A dirty, worn, or warped mouse pad can cause some movement problems. Run the mouse on a book, file, or other flat surface and see if movement improves. If so, clean the mouse pad with warm, soapy water (then dry it with a lint-free cloth or let it air dry) or simply replace the pad.

Static buildup. If your mouse works for a bit and then stops, it could be a result of static buildup. Inexpensive mice in particular can fall victim to this. Solutions include spraying down carpeting and upholstery with a fabric softener to dissipate static and having an electrician check to make sure everything is grounded properly. Alternately, you could invest in a slightly more expensive, more static-resistant mouse.

Normal system usage. If your mouse stops working occasionally when you're running a large application or two, this may simply be because your system is busy processing information. Before assuming the worst and forcing a reboot, wait a few moments to see if the mouse unfreezes. Short of upgrading your system (with a faster processor or more memory), try running fewer applications at a time.

The next time your mouse acts up, try these problem-solving tips before throwing the mouse or banging it in frustration on the desk. Your mouse will thank you for it.

by Rich Gray



Sites such as DriverGuide.com feature driver search engines, news, and even driver request boards that will help you replace an ailing mouse driver.

How To . . .

Fix Common Keyboard Problems

Cookie crumbs, paper clips, dead beetles, hair, peppermint tea . . . it's amazing what can wind up inside a keyboard. Although the mouse is handy for moving around your screen and doing many tasks, the keyboard is still your primary input device on your computer. And with 84 to 101 keys and a large, mostly open surface, it takes only a small foreign object or a little dust to adversely affect its operation. Keyboards are generally hardy though, and through routine maintenance and light troubleshooting, you can avoid or fix some of the most common troubles you may encounter.

What You Need To Know

Benefits
Keeping your keyboard running smoothly will make sure you can input data without problems.

Tools
A key-pulling tool, a can of compressed air, an electronics-grade contact cleaner, and distilled water

Time
A few minutes for simple cleaning and troubleshooting or a couple of days if you need to air-dry a wet keyboard

Skill Level
Easy to Intermediate

Cost
$$$ A few dollars for cleaning supplies

Cables & Connectors. One of the common problems you will face with your keyboard will be in the area of cables and connectors. Like the mouse, many keyboard cables develop problems from abuse, such as when you yank or tug on your keyboard's cord or accidentally knock the keyboard off your desk. The points where the cable connects to the motherboard and the keyboard also can become loose or damaged due to the stresses placed on them. When you boot up and receive errors that say the keyboard is not attached or has failed, you may have problems in this area.

To check cables and connectors, first shut down the computer. Carefully examine the cable, making sure it isn't bent, stretched, or visibly damaged or frayed. Make sure the connectors that plug into the back of the computer and the keyboard are not loose. Unplug, if you can, and physically inspect them, checking to see that the pins on the inside aren't bent, pushed in, or broken. Firmly push the plugs back in and reboot to find out if the problem persists.

When it comes to plugging a new keyboard into your computer, don't force the connector into the port. A couple of different keyboard ports exist—AT and PS/2 are the most common—and you'll need an adapter (available at most computer supply stores) to use a certain keyboard type with a different port type. Before you go buy an adapter though, note the number of pins and holes on both keyboard and port so you'll get the right one.

Some computers also feature two ports: one for your mouse and one for you keyboard. Make sure you have each one plugged into the correct port, or you'll have problems using either one.

Clean Is Key. As mentioned, keyboards are fertile ground for the collection of all sorts of stuff. Whether it's simple dust and crumbs or a full cup of coffee, getting it out of your keyboard before it does any damage or hurts your keyboard's performance is a priority.

There's not a whole lot you can do to prevent dust and grime from getting into your keyboard (using a dust cover when you're away from the computer can help), but you can diminish the buildup of food particles by keeping all foods away from your computer. As debris builds up in the keyboard, your keys may stick or become defective. This is why you need to regularly clean your keyboard.

To remove simple items such as dust and crumbs, first shut down the computer and unplug the keyboard. Flip it upside down and gently shake or tap the back. A can of compressed air works well here to dislodge materials.

If this doesn't dislodge the debris, you may have to remove a few keys and use a soft-bristled brush. Before you begin removing keys, make sure you note each one's place on the keyboard so you'll be able to put them back correctly. To remove the keys, it's best to use a special key-pulling tool (available at your local computer supply store). Pull carefully when removing keys and remove only as many keys as necessary. If you can help it, don't remove the Spacebar. A wire running through this key

holds it level, and it can be difficult to remove and get back on correctly.

Once you remove the keys, use a soft-bristled brush to dislodge the material and then blow it free with compressed air. Replace the keys, plug the keyboard back into the computer, and reboot to see if the keyboard works.

If you're having trouble with specific keys, use an electronics-grade contact cleaner on the offending key switches. With the keys removed and after a thorough cleaning, squirt a little cleaner down into the contact. If there is a small plastic or rubber boot on the contact, you can usually lift it up a little so you can reach the contact to spray it. Depress the key several times to work the cleaner in.

If possible, avoid using a vacuum cleaner to clean your keyboard. Vacuums can build up a static charge, which can potentially damage your keyboard.

Staples and paper clips. You should immediately take care of objects such as staples or paper clips that fall into your keyboard. These can jam keys and cause them to short out, and they can really do some damage if they fall into the circuitry. If something of this nature does fall into your keyboard, don't move the keyboard. Shut down your computer, remove the nearest key(s) to the item, and pull the item out with non-magnetic tweezers or needle-nosed pliers.

Spills. Liquid spills are probably the biggest threat your keyboard faces. If you do accidentally spill something into your keyboard, immediately shut down and unplug the PC. Tilt it to drain the liquid out, then rinse the area where the liquid went in with distilled (preferably) water. You may have to disassemble the keyboard housing (remove the screws in the back) to do this thoroughly.

The problem with spills such as coffee or soda is that these types of drinks are not just liquid. Most beverages, including regular water, contain solids in the form of sugars, dyes, and minerals. Because these can coat the printed circuit board and damage the contacts, you should immediately rinse out these substances with distilled water. In addition, any dust in your system will turn into glue in the presence of a sticky liquid.

The Keyboard Properties dialog box lets you set the Repeat Delay and Repeat Rate for when you hold down a key.

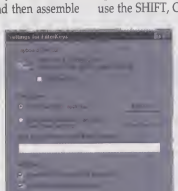
After rinsing the keyboard, set it aside to let it completely dry (some recommend following the distilled water rinse with a distilled alcohol rinse, which will help it to dry). Use contact cleaner on each key switch and then assemble the keyboard, plug it in, and test it. If you have problems with the keyboard, you will probably need to buy a replacement.

Keyboard Properties. If you're having troubles with the way characters appear on your screen after you type them, you can fine-tune many options with the Keyboard Properties dialog box. To access the dialog box, select the Start menu, Settings, Control Panel, and then Keyboard.

Most of the keys on your keyboard have a repeat rate; if you push and hold a key, it will start repeating. On the Speed tab, you can select the repeat delay (how long the system waits after you depress a key until it starts repeating) and the repeat rate (how fast a key will repeat when held down). You can test these rates on the Speed tab in the text box at the bottom of the Character Repeat section.

The Language tab shows the keyboard languages and layouts you have and lets you easily add or switch between them. If your keyboard starts spitting out strange letters or accents or consistently prints a character to the screen that is different than the one you typed, it could mean the settings on this tab are off. You can quickly set a language/layout as a default by highlighting it and clicking the Set As Default button. Clicking Add pulls up a list of available languages that you can add to your system. (*NOTE: To install any languages that are not on your system, you'll need to insert your Windows installation CD-ROM.*)

Another area in which you can change your keyboard's controls is on the Keyboard tab in the Accessibility Properties dialog box. To access it, open the Start menu, select Settings, click Control Panel, and double-click Accessibility Options. From here, you can set up additional keyboard features that let you use the SHIFT, CTRL, or ALT key by pressing one key at a time; ignore brief or repeat keystrokes; and hear tones when you press the CAPS LOCK, NUM LOCK, or SCROLL LOCK key.



The Accessibility Properties dialog box gives you additional key behavior options, such as how your system handles quickly repeated keystrokes.

Miscellaneous Problems & Solutions. Some other things to keep in mind when troubleshooting your keyboard include:

Reboot. Rebooting as a first step in most aspects of computer troubleshooting is a good strategy and can fix many problems.

Mix and match. If you have access to another keyboard or computer that will fit the offending keyboard or computer, try one part with the other (your keyboard/other system, or vice versa) to see if you can figure out whether the problem is with your keyboard or system.

Switches. Some keyboards may have a switch on the bottom that makes them more accessible to different types of computers. If you're having problems, you might have accidentally changed this switch.

Sloppy booting. Be careful you're not holding down a key while booting because this can cause errors.

Software conflicts. Even though software conflicts are rare, some applications have issues with some keyboards. If your keyboard acts screwy with only one program, try the keyboard or software company's Web site to see if any documentation exists on the problem. In addition, check any Readme files that might have come with the program.

It Is Your Choice. Keyboard performance is subjective, and given the amount of time you'll be spending on one, you may want to consider spending a few dollars to replace a keyboard that doesn't work or feel right to you if none of the above solutions fixes your keyboard problems. LS

by Rich Gray

How To . . .

Mend Common Monitor Mishaps

Although you might be able to fix several computer components hands on, your monitor isn't one of them. Monitors contain capacitors that hold large amounts of electricity, enough to hurt or kill a person, even when the monitor isn't plugged in. So you should never open your monitor; leave that to trained professionals. But not all display problems require you to take apart the monitor to fix them. Some problems can be easily fixed at home without much expense. To decide if your monitor needs a trip to the repair shop, first determine where the problem is.

No Lights, No Power. Most monitors include an activity light in the front that comes on when the monitor is powered on. If you get a blank screen and this light doesn't turn on, your problem is that the monitor is not receiving any power.

It may sound a little too simple, but check to see if the monitor is plugged into the electrical outlet or surge protector. Make sure that the plug is firmly situated in the power port on the back of the monitor, as well.

Next, check to see if the outlet is working by plugging another appliance into the outlet.

What You Need To Know

Benefits
Properly display colors and images on-screen

Tools
Philips screwdriver

Time
5 minutes to 2 hours

Skill Level
Easy to Intermediate

If you're using a surge protector, unplug the monitor cable and plug it directly into the wall to see if the problem is with your surge protector.

If all else fails, try pressing the power button again. Perhaps you didn't actually turn it on or the computer was in sleep mode and you turned it off.

Lights On, But No Picture. If the activity light turns on, but the monitor is blank, your monitor is getting power; it just isn't getting the images accurately on-screen. Perhaps your contrast or brightness settings were accidentally changed so that the screen appears black. Adjust the knobs or buttons on your monitor and see if your picture fades back into view.

Again, make sure the computer isn't merely in sleep mode. If you walked away from the computer after starting it, it might go into sleep mode automatically after several minutes to conserve power. To "wake up" the system, press a key on the keyboard or click your mouse.

If it's not asleep, check the cable between your computer and your monitor. Make sure they are connected securely. Also, check the pins on the connectors. Disconnect the monitor cable from the back of your PC and check that all the pins are in place and none have fallen out. Also make sure none of the pins are bent or pushed in.

Another source of the problem might be the video card inside your PC that sends the image signals to the monitor. Open your computer case, ground yourself by touching something metal on the outside of your computer case to prevent shocking any of the inner circuits, and locate your video card, which is usually plugged directly into the motherboard. Make sure the video card is firmly seated in the slot inside the PC.

If you can't see the problem, sit back and listen. Boot the computer and listen to the sounds it makes. If you hear it run through its internal test and emit a signal beep, the computer has successfully run through its paces and everything inside is OK. If, however, you listen and nothing happens after a minute or two, the problem may not be with your monitor, it might be with the inner circuitry of your computer (such as your motherboard). Then again, if you hear a double beep instead, this indicates that the computer has run across a problem with the system and it could mean something is wrong with your video card.

A White Out. A black screen isn't the only color that indicates there is a problem. In some cases, the display will be entirely white or gray. Perhaps there is a flaw in the connection between the monitor and the video card.

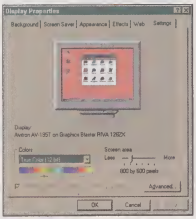
Again, open the computer case, ground yourself, and make sure the gray cable that runs from your video card to the motherboard hasn't been stretched too far. Also, make sure it isn't kinked or pinched so that it can't function properly.

If the problem is not the video card cable, attempt to connect the monitor to another computer, if possible. If the monitor operates, you know the problem is with your PC or video card. If it doesn't work, the problem may reside in the monitor and you'll need to have it repaired.

Crazy, Wavy Images. Another source for your monitor woes might be with the items that surround it. Does your monitor seem to go

crazy when you turn it on? Do images have a bouncy or wavy pattern or appear fuzzy? Are some of the colors mixed up? The problem might be magnetic interference from another electrical device located close to your monitor.

Many monitors, unless they are LCDs (liquid-crystal displays) commonly used in notebook computers, use magnetic means to create the image on-screen. Most monitors also have a feature called degaussing built into them to get rid of the extra magnetic build up. Extra magnetic fields can build up if your monitor hasn't been degaussed for days or if you have a device close by that radiates magnetic fields. The most common excuse is stereo speakers or a subwoofer. Computer speakers, on the other hand, are probably shielded to prevent them from bothering your monitor. Computer subwoofers, however, frequently do not include shielding, which is why speaker manufacturers recommend that you place them under your desk, away from your computer and components.



If your colors look odd, use the Display Properties dialog box to adjust your color settings to a more appropriate level.

Look around your desk for other devices that may be causing interference. Also, check your outlet. If you have other appliances plugged into the outlet, they may be causing line interference that can cause visible effects on-screen. In addition, read your monitor manual to see if there is a degaussing button you should push to manually degauss the monitor. Many monitors are self-degaussing and perform this function whenever you turn them on. If your monitor has been left on for several days, it wouldn't hurt to turn it off for a few minutes and turn it back on to degauss it and get rid of the magnetic build-up.

Color Clash. Does your monitor seem to be missing something? Maybe it once had such a capable display, but now seems to have color blindness. Do the colors appear odd, or does your monitor not seem to have much color variety?

You may have your color setting too low. Your computer can display 16 colors, 256 colors, or 16-bit high color, depending on the capabilities of your monitor and video card. You can change the color settings by clicking Start, Settings, Control Panel, and double-click Display. Select the Settings tab, choose a new setting from the drop-down menu, and click OK. You will probably need to restart the computer, too.

Beware Of Ghosts & Lines. If you seem to have two of everything on your monitor screen, you might have ghosts. Ghosting appears as duplicate, lighter versions of the original, set off to the side of the original images. The problem most likely occurs during the transferring of images to your monitor.

If you've installed a signal splitter on your monitor cable, get rid of it. If you've installed a cable extender to the end of your monitor cable to give you a few more feet of cord, get rid of it. Or, you can learn to deal with ghosts.

If the ghosts don't appear as images, but as a couple of thin gray lines on-screen, you may not be experiencing a problem at all. These lines are formed by monitors with aperture grills, such as Trinitron monitors. Many monitors use electron guns that shoot through sheets with holes. An aperture grill monitor uses a grill formed by vertical wires instead of the sheet to keep all the phosphors in line. Two horizontal wires hold all the vertical wires in place. When the monitor displays light images, occasionally these wire lines appear on-screen. What you are seeing is the shadow of the two horizontal wires. Although you can't make the lines go away on a light background, you can switch to a darker background so you don't see them.

Off Center. Maybe your Desktop seems out of kilter. Don't worry; it's probably not you. It's probably your image size and position knobs. Many monitors now allow you to adjust how tall or wide the Desktop appears within the viewable area of your screen. You can also adjust how far to the left or right the Desktop displays.

These knobs can be bumped or turned accidentally, making the screen seem off center. Simply adjust the knobs until the Desktop is appropriately centered.

Popping & Hissing. Most monitors make a little noise as they operate. The older the monitor, the more noise it might make. It also might make a slight whirring or humming sound when it first starts, as well as an occasional popping sound. However, if the hissing and popping seem to be increasing in frequency and getting louder, you might be developing problems. These sounds can indicate trouble with your power cable. Try a new power cable and see if this solves the problem.

Dust can also wreak havoc, especially inside the monitor. If the excessive popping or hissing continues, take the monitor to a repair shop to be serviced. The solution may be that a service technician needs to get rid of the dust on the inside of the monitor. If there is also a warm or burning smell, an internal component could be burning out and needs a replacement. The solution for this also warrants a trip to the repair shop.

Locate A Trained Technician. If none of these do-it-yourself tricks seems to help, you have two final alternatives. One, find an authorized service technician by contacting your monitor manufacturer or checking the manufacturer's Web site to locate someone in your area. The cost can run from $50 to $200. Before you agree to pay more than $200, keep in mind that you can purchase a new monitor for around $150 to $200. LS

by Cindy Krushenisky

Monitor Maintenance

Keep your monitor humming along smoothly by following these tips.

- Place your monitor on a flat, sturdy surface. Keep it free from other appliances that might emit magnetic fields.
- Regularly dust the top and front of the monitor with a lint-free cloth. Some manufacturers suggest that you clean the screen with a damp cloth or ordinary window cleaner.
- Clear the top and sides of the monitor. If you block the vents, the monitor may overheat.
- Replace cords that are kinked or frayed. ☐

How To . . .

Fix Common Diskette Drive Problems

The diskette drive, a main staple of personal computers for more than two decades, gets little attention these days, until it stops working. Then we realize how much we depend on this underappreciated part for so many things: backing up important data, copying files to another computer, and even recovering from hard drive disasters. Like everything with moving parts, your diskette drive is doomed to fail eventually. If the drive dies and you're still in need of its services, here are a few of the most common problems you may run into with your drive and what you can do to resuscitate it.

(NOTE: Some of the following tips involve working inside your computer and/or inside the diskette drive itself. Opening your computer's or the diskette drive's case may void its warranty. In addition, you need to be cautious of static discharge. Work in a low-static environment, such as a non-carpeted room, and keep grounding yourself by touching a metal part of your computer's chassis.)

What You Need To Know

Benefits
Diagnose and fix diskette drive problems to keep it running.

Tools
Paper clip, knife, or other flat object; screwdrivers; canned air; and diagnostic software

Time
30 minutes or more

Skill Level
Easy to Intermediate

Cost
$$$
New diskette drives cost less than $30

Keep It Clean. A diskette drive works by spinning the inner part of a diskette like a record. Electromagnetic sensors, called heads, brush against the disk to read its magnetic media. Because the heads touch the disk, they tend to pick up dust and other contaminants, and after months of use the accretion builds up. Eventually, the layer of grime will start to interfere with the heads reading and writing to the diskette, and that's when the drive will start having problems. If diskette after diskette seems to be failing, it's probably not the diskettes that are at fault but the drive's dirty heads.

Cleaning the drive heads is easy. You can buy a diskette-shaped cleaning tool at most computer stores, and using it is just a matter of applying the cleaning fluid, inserting the cleaning diskette into the drive, and accessing the diskette drive with your computer by double-clicking the drive's icon in Windows' My Computer. The cleaning diskette will rub the alcohol-based fluid on the heads and scrub the dirt off in a couple of passes. Use the kit every few months to keep your drive clean and avoid possible complications later.

The Diskette Won't Go In. If you're having problems inserting your diskette into the drive, first make sure you're inserting it in the right direction. This seems obvious, but even computer experts can make a mistake when they're in a hurry. The correct direction is label-side up, metal circle down, and put in the end with the sliding metal disk protector. Next, check inside the drive slot for any object that might be jammed inside. If you see something, try using a paper clip or a pair of pliers to carefully get it out.

If the problem is that the diskette goes most of the way in but won't stay in, check to see if the eject button is jammed or hung up. It needs to pop out or the diskette won't stay. If you can't seem to find a problem from the outside, you can try taking the cover off the drive and checking its insides. (See the Inspecting & Repairing The Drive section below.)

The Diskette Won't Eject. The biggest cause of stuck diskettes is the diskette itself. Sometimes, the metal protective shutter becomes slightly bent and hangs up on something inside the drive. Even more often, the diskette's label will start to peel and stick to the drive interior, keeping the disk from ejecting. If you can peer into the slot and see one of these problems, grab a thin flat object, such as a knife, nail file, or even a paper clip. Use the tool to smooth down the label or unhook the shield. If the shield won't come loose, pull the diskette out if you must, but you will probably need to open up the diskette drive to retrieve any parts left behind.

If you have an electrically ejecting diskette drive, such as a SuperDisk drive or a Macintosh diskette drive, try to manually eject the diskette. Usually there is a tiny hole somewhere on the front or back of the drive. Stick a straightened paper clip in the hole to eject the disk.

The Drive Makes Noises. Diskette drives are noisy to start with, but by now you are probably familiar with your drive's normal sounds. If it starts to make strange noises or

seems to be clicking a lot more than normal, try cleaning the heads. This eliminates the possibility of noises related to the drive trying very hard to read a disk. If the noises continue, a larger problem may be looming. You can look inside for the cause or you can just go ahead and replace the drive. A new unit should cost less than $30 at a local dealer.

You Can't Write To A Diskette. There could be several causes for errors when writing to a diskette. The first thing to check is that the write-protect tab is covering the hole in the corner of the diskette. If you see a hole in the corner of the diskette, the diskette is "locked" and cannot be written to. Slide this tab the other way (so you don't see a hole) to restore your ability to write to the diskette. If the tab is missing, you can simulate one by covering the hole with a piece of tape. If it's still not working, run the head-cleaning process a couple times. If this doesn't fix the problem, you'll need to look inside to make sure the internal cables, both the flat data cable and the smaller power cable, are plugged in correctly.

Problems With A New Drive. If your computer or diskette drive is brand new and you're having problems, double-check that everything is set up correctly. First, check the diskette drive's settings in your computer's BIOS (Basic Input/Output System). You can press DELETE or F2 during boot-up to enter the BIOS. Which part of the cable is your drive plugged into? If there is only one drive, it needs to be plugged into the last segment, after the little twist in the cable. If there are two drives, the one after the twist (moving away from the motherboard) is drive A: and the one before the twist is drive B:. Make sure the BIOS is set up to reflect this. Also check the orientation and alignment of both the data and power cables (see the Inspecting & Repairing The Drive section below).

Also, remember all the components in your computer work together as a team, so diskette drive problems could stem from other sources. Try replacing the data ribbon cable or plugging a different power connector into the drive. You also can use a diagnostic utility that might point you to the problem. Some good ones are CheckIt (http://www.checkit.com), SANDRA (http://www.3bsoftware.com), AMIDiag (http://www.ami.com), and BCM Diagnostics (http://www.bcmcom.com).

Finally, if you completely replace the diskette drive, and that didn't fix your problem, investigate your diskette drive controller (usually built into the motherboard) or your power supply, either of which could be the source of your troubles.

Removing The Diskette Drive. If you want to replace the drive or open it to inspect it, you can remove it without much trouble as long as you work carefully. First, prepare a clear, static-free workspace and get a small container for any screws you need to save. Next, unplug the power cable and other cables from the computer and open it up. Find the diskette drive inside and disconnect its data and power cables. Make note of the data cable orientation for when you put it back later.

The drive is usually secured by four screws, so remove these while supporting the drive with your other hand to keep it from falling on anything. The drive may be mounted in a larger removable housing that contains several drives, in which case you'll have to remove the housing before you can extract the drive. Otherwise, pull the drive out through the front of the computer.

Inspecting & Repairing The Drive. A novice can repair some diskette drive problems, especially those that involve loose parts or objects stuck inside. However, there is a chance that messing around with the diskette drive's internal parts will make your problem worse. If you open the drive, do so at your own risk.

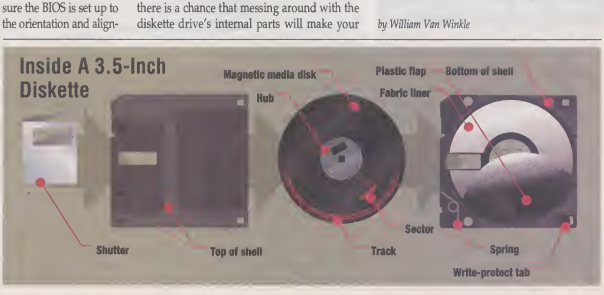
To get the drive open, remove the screws that are holding its case together; you may need to remove the drive's faceplate to get the cover off. Once you have the drive open, take some time to inspect the mechanism to see if anything looks out of place. Turn the drive upside down and shake it over the table. If anything falls out, it was probably what caused your trouble. Next, put a diskette in the drive while watching it and look for anything that might be broken. You can fix plastic parts with the proper adhesive, and sometimes you can put loose parts or springs back where they belong. You also can try blowing the insides with canned air to get rid of dust and dislodge any unseen dirt down inside.

Replacing The Drive. If you can't fix the drive, don't worry. New diskette drives aren't expensive, and you can pick one up from almost any computer store. If you did fix it, congratulations. Put the drive back together, reinstall it, and fire up your system.

Installing the diskette drive is the same as removing it, except backward. Put the drive back in the case but watch how you plug in the cables. The data cable's marked wire, which is typically red, needs to match up with Pin 1 of the diskette drive's data plug. Another common mistake is connecting the power plug incorrectly. If only three of the four pins are plugged in, it can keep the computer from starting up.

Once everything is in place, start up the computer and test the diskette drive to see if it works. Running a thorough ScanDisk (click Start and select Programs, Accessories, and System Tools) on a diskette is a great way to test your drive. LS

by William Van Winkle



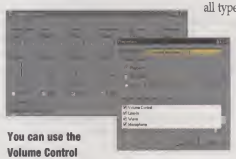
How To . . .

Fix Common Microphone & Web Camera Problems

Microphones and Web cameras are similar enough in function (one allows for the input of audio, the other for the input of video) that many troubles that crop up for one can occur in some form in the other. One of the biggest sources of problems for microphones and Web cameras is they both rely heavily on other aspects of the computer (including software and hardware) to do their jobs. Successfully troubleshooting either one entails not only a consideration of the state of the device itself, but also the support system behind it.

Behind The Mic. The support system for a microphone can compose many different parts, including the sound board that the microphone plugs into and the software that determines sound characteristics to the specific application you're using the microphone with and the speakers that the sound comes out of. One of the most basic parts, though, is the one you should check first: the cable, and particularly the port that it plugs into. Examine the microphone cable and make sure it is in good shape. It shouldn't be frayed, laid bare in places, or bent at such an angle that it looks like it might be damaged.

It's also important that you firmly plug the microphone into the right **port** (a device, resembling a plug-in, that allows access in and out of a computer for cables) in the back of the computer. Sound boards will usually come with a variety of port options, including jacks where you can plug in a microphone, headphones, speakers, and other devices. Make sure your mic is plugged into the right place (usually signified with a little microphone picture), and while you're back there, check that any speakers you have are also plugged into the correct jack. Follow the speaker wires out to the speakers, checking to make sure they aren't damaged. If your speakers require power to run, make sure they're plugged into a power source and that any applicable switches (or volume controls) are turned on.



You can use the Volume Control dialog box to set Playback and Recording levels for various sound sources on your system.

Who's driving this thing? Out of date or defective sound drivers can also be affecting your ability to record sound. Visit the Web site of the manufacturer of the device in question or visit a site such as DriverGuide.com (http://www.driverguide.com) to search for one.

The sound card is one device that updating drivers can help. In addition to the driver malfunctioning, sound boards can simply stop working, and you will need to replace them. Some sound boards can also be incompatible with some microphones, particularly if the two were made by different manufacturers. Checking the Web site of the microphone or sound board manufacturer for patches, a known-issues FAQ, or other information is your best option here. The Devices tab in the Multimedia Properties dialog box provides information on Multimedia drivers of all types on your system. You can reach the Multimedia Properties dialog box by clicking the Start menu, Settings, Control Panel, Multimedia.

Pump up the volume. It may seem rather simplistic to say, "Turn the volume up," but if you're having trouble recording and playing sound, it could be the fault of one of several volume controls. (*NOTE: Depending on your brand of sound board and installed devices, the appearance of your system's dialog boxes and the features they offer may vary a bit.*) First, check your speakers, the back of your computer where you plug the microphone in, and even on the microphone itself for any volume controls. You can set the system sound, both playback and record, from the Volume Control panel. Click the Start button, Programs, Accessories, Entertainment, and Volume Control to access it or right-click the speaker icon in the lower-right corner of the Taskbar and select Open Volume Controls. Under the Options menu, select Properties. In the Adjust

What You Need To Know

Benefits
Keeping your microphone and camera working well will allow you to get the most out of your computer's multimedia capabilities

Time
Will vary depending on task, but usually not more than 10 to 15 minutes each

Intermediate

Skill Level
Intermediate

Volume For box, select the Playback radio button. Then under Show The Following Volume Controls, make sure there is a check mark in the Microphone box. Do the same thing for the Recording option so it will show up in both parts of the mixer.

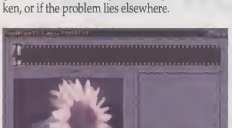
The Volume Control slider on both microphone sections in the mixer should be up at least halfway. You should also make sure that the master Volume Control slider on the Playback mixer is up enough so that you can hear it. Clicking the Advanced button under the master Volume Control slider will give you additional sound options (as will clicking the microphone Advanced button in the Recording section). Also, make sure to select the microphone in both mixers (check the Select box under them) and unselect the Mute All box.

You can further adjust the performance of your microphone from the Audio tab in the Multimedia Properties dialog box (Start, Settings, Control Panel, Multimedia Properties). Here you have several playback and recording options, including the ability to select preferred devices for sound control and choose performance options for recording (under the Advanced Properties button).

Sound Recorder is a good way to test if your microphone is working. Launch it by opening the Start Menu and selecting Programs, Accessories, Entertainment, Sound Recorder. This small application will let you record your voice or some other sound, rewind the recording, and play it back. You can also edit the recording, add effects, save it, and more.

Works fine, sounds bad. If your microphone is working, but the quality of the sound is not as good as you want, there could be a number of causes. It could be that you have a low-quality sound board. An expensive microphone is only as good as the sound board it plugs into. The positioning of the microphone could also affect the sound quality, particularly in applications such as Microsoft NetMeeting. If you find you're getting a lot of echoes, your speakers may be feeding into the microphone; try to adjust the mic sensitivity or move it and the speakers away from each other. Muffled or distorted sound could be a sign that you are too close to the microphone or that it needs some form of screening (such as the spongy coverings you might have seen on some microphones).

Other things to try. Never underestimate the power of a reboot when it comes to any computer problem. If you're having trouble recording with only one application, check its Web site for patches or information or uninstalling and then reinstalling the application. If possible, try using the mic with another computer or another mic with your system. This should give you a good idea of whether your microphone is broken, or if the problem lies elsewhere.



Use applications such as Windows Imaging with your Web camera to take and save snapshots.

Web Camera Woes.

Web cameras, or Web cams, also rely on many diverse parts (the camera itself, the software that operates it and applications you use it with, your computer system) to function correctly. Errors in any of these areas can adversely affect or kill Web cam functioning.

Check the cables. As with the microphone, one of the first things you should check if you encounter Web cam problems is the cable attaching it to the computer. Make sure the cable is in good shape and firmly plugged into the correct port. If you have a USB (Universal Serial Bus) camera, you can plug it in and unplug it without shutting down your computer. However, if your camera makes use of another port (such as parallel), you'll need to shut down the computer before dealing with the cables. An error message of "Camera not ready or already in use" may be an indication of cable problems.

System sorrows. Your system can be a big contributor to Web cam problems, and making sure it's in peak running condition will help you to avoid many problems. First, verify that your system will support the camera. Run ScanDisk and Disk Defragmenter to smooth out existing problems and increase performance and reboot your system.

Your system may need a BIOS (Basic Input/Output System) update, which you can verify by checking with your computer or motherboard manufacturer. Also, if you go to install a USB cam and get a message saying that the USB port wasn't detected, you'll need to get in touch with your computer or motherboard manufacturer to get information on how to activate the USB port in the system BIOS.

Once again, if you can test the camera on another system, you may be able to zero in on troubleshooting areas a little more closely.

Software. All Web cams need some form of software to make them work, and your best bet is to install the software that came with the camera. If you run into camera problems and you think your software is to blame, try uninstalling it, then reinstalling. You can also check the manufacturer's Web site for any driver updates.

If you think a specific application is conflicting with your camera, try the camera with another application. Numerous **freeware** (software available at no cost to the user) and **shareware** (copyrighted software distributed on a free-will donation basis) software for Web cams can be found on the Internet; try doing a search on a site such as Download.com (http://www.download.com). Applications such as Windows Imaging (Start, Programs, Accessories, Imaging) and Microsoft NetMeeting (Start, Programs, Accessories, Communications, NetMeeting) both come with Windows and offer free ways to test your Web cam. If for some reason NetMeeting is not on your system, you can download it from the Microsoft Web site at http://www.microsoft.com/windows/netmeeting.

If you install your Web cam software and then have a problem with a previously problem-free program (or if installing a program causes problems with your Web cam or its software), you should check both the program and your camera manufacturers' Web sites for patches or other information on the problem.

Conflicting devices. Another problem can occur when two video capture devices conflict with each other. To see if this is what's causing your problem, click the Start button, select Settings, Control Panel, and double-click the Multimedia icon. Go to the Devices tab and check to see how many devices are listed under the Video Capture Devices section. If there is more than one, highlight the device you want to disable, click Properties, and in the Devices Properties window, select Do Not Use This Video Capture Device. Click Apply, reboot, and test the camera.

Check the source. Finally, it's always a good idea to check the camera manufacturer's Web site when any problems crop up. Most manufacturers offer software and patch downloads, as well as comprehensive troubleshooting and tech support areas, all of which are regularly updated. LS

by Rich Gray

How To . . .

Fix Common CD & DVD Drive Problems

Today's CD-ROM and DVD-ROM drives are extremely fast and depend on their parts to work quickly and accurately. Unfortunately, dusty, worn-out internal parts or physical jarring can lead the components to fail. In addition, problematic software settings can cause low performance or even keep a CD- or DVD-ROM drive from working at all. If you have an optical drive that stops working or a new drive that doesn't work right out of the box, there are a few techniques you can use to find a solution.

(NOTE: Some of these tips involve opening the computer, which can void the warranty on some systems. In addition, you need to be cautious of static discharge. Work in a low-static environment, such as a noncarpeted room and keep grounding yourself by touching a metal part of your computer's chassis.)

General Troubleshooting & Settings. When your CD/DVD-ROM drive gives you trouble, the first and easiest troubleshooting step is to properly clean the drive. This will remove dust and dirt that can obscure proper beaming or reading of the laser mechanism. You can pick up a common CD cleaner disk at most electronics and computer stores. Using it can eliminate many problems with accessing and reading CDs.

The next tool you should pick up is some troubleshooting software, which typically includes several CD/DVD-ROM tests that can find out if the drive itself is at fault. Some good troubleshooting packages are SANDRA (http://www.3bsoftware.com), AMIDiag (http://www.ami.com), BCM Diagnostics (http://www.bcmcom.com), and CheckIt (http://www.checkit.com). Note that troubleshooting software will work properly only if a disc can be inserted into and detected by the CD/DVD-ROM drive.

If the drive you're having problems with is new, check its jumpers. If the CD/DVD-ROM drive is by itself on the data cable (the wide thin ribbon with many gray wires), it should be set to master, often marked as MA on the rear of the drive case. If the drive is sharing the data cable with another device, such as a hard drive or an internal Zip drive, you can try switching it to slave (SL) and setting up the other device as the master.

You probably have two IDE (Integrated Drive Electronics) ports on your motherboard, the primary and secondary. See the markings on your motherboard or its manual for details. If the drive doesn't work on one port, try switching it to the other.

Drive settings. Problems can pop up if Windows' CD/DVD-ROM drive settings are incorrect or have changed. For example, in Windows 95 or Windows 98, your drive might be using compatibility-mode drivers instead of the normal ones. Click the Start button, select Settings, click Control Panel, double-click System, and then select the Performance tab to see if this is the case. For more help, refer to Microsoft's Knowledge Base at http://support.microsoft.com/support/kb/articles/Q151/6/34.asp.

Other CD/DVD-ROM settings are available in the Device Manager, which you can access by clicking Start, selecting Settings, clicking Control Panel, double-clicking System, and then selecting the Device Manager tab. Double-click the CD/DVD-ROM drive in the list, then click the Properties tab to see its settings. AutoPlay and DMA are the settings you can experiment with. Double-click the channel the drive is on (probably Secondary) and then click the Advanced Settings tab. Windows' integrated Troubleshooter Wizard might help you out, too. For you're in the CD/DVD-ROM properties in the Device Manager, you can click the Troubleshooter button, or you can find it by clicking Start, selecting Help, and then clicking Troubleshooting.

Trouble With Playback. If the drive is working fairly well but it skips, try cleaning it with a cleaning CD. Otherwise, check the audio cable that runs from the back of the CD/DVD-ROM drive to the sound card. Make sure it's plugged into the port on the sound card labeled CD Audio. Also, don't forget to double-check the sound level in Windows' Volume Control by double-clicking the yellow speaker in the Taskbar's System Tray.

If your CD/DVD-ROM drive is operating normally except for the inability to play audio CDs, chances are either your audio

What You Need To Know

Benefits
Diagnose and repair common CD- and DVD-ROM drive problems to keep it running

Tools
Cleaning CD, screwdrivers, canned air, tweezers or pliers

Time
1 hour

Skill Level
Easy to Intermediate

cable is defective or you're missing one altogether.

Software CDs Won't Install. If you are trying to install new software but nothing happens when you put the disc in the drive, the CD's AutoRun function may not be working. You can bypass this by opening My Computer and right-clicking the CD/DVD-ROM drive, clicking Open, and then finding a setup or installation program on the CD. If the Open command doesn't work or it gives you an error, try a disc that you have used successfully before. If the old disc works fine, suspect a problem with the new disc, particularly a scratch or smudge. Often, you can remove problematic dirt from CDs by using a damp, very soft cloth and repeatedly wiping the surface of the disc from its center toward the outer rim.

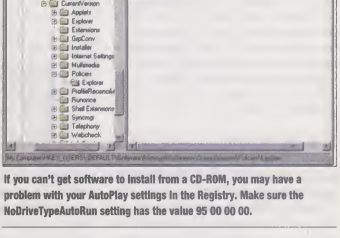
If a tried-and-true disc still doesn't work, check your AutoPlay settings in the Registry. Click the Start button, select Run, type **regedit**, and then press ENTER. Next, navigate to HKEY_USERS\.DEFAULT\Software\Microsoft\Windows\CurrentVersion\Policies\Explorer. In the NoDriveTypeAutoRun setting, it should have the value 95 00 00 00. If not, double-click the entry and enter this value. If you don't see any changes after tweaking this value, try using troubleshooting software to narrow down the problem or borrow another CD-ROM drive to see if the problem goes away. If it does, you will need to buy a new drive.

Strange Noises Or Vibrations. If this is a newly installed drive, make sure the mounting screws are tight and the drive isn't loose in the chassis. Older drives, however, can start to develop noise problems as their parts wear. This is normal, but it may be a sign that the drive is due to be replaced. New high-speed drives may vibrate or emit noise with only certain discs; this is the fault of the disc itself. Sloppy disc manufacturing leaves them slightly unbalanced, and when spun at very high speeds, they cause vibration. Thick labels stuck on a disc can also have the same effect.

If your drive seems to be changing speeds a lot (spinning quickly and then spinning slowly), a dirty lens might be the cause, in which case a couple passes with a cleaning CD would fix it. If spin-up problems such as this occur with certain discs only, the data on the disc may be to blame. Certain types of copy protection make deliberate errors on the disc, which may be confusing your drive. There isn't much you can do about this except replace the drive with a different make and/or model.

Noises also can be caused by foreign objects. Anyone with young children should put this high on the list of likely causes. Look inside the drive slot with a flashlight. If you see anything out of the ordinary, such as food crumbs, try to dig it out with tweezers, needle-nosed pliers, or a bent paper clip. You also can try opening up the drive (see the "Take a look inside" section below).

Jammed Tray. If the drive tray won't open or close, don't force it or you'll end up destroying the mechanism. If there is a disc stuck inside the tray, try gently pulling it out with some tape-covered pliers (so you don't damage the disc). If it's not a disc, some other object may be in there causing mischief. You can try the manual release to open a stuck tray. Straighten a paper clip and carefully shove it in the tiny hole by the tray door to release the tray. This is also useful for extracting CDs you accidentally left in the drive after removing the drive from a system. If none of these things helps, you may need to open up the drive or replace it.



If you can't get software to install from a CD-ROM, you may have a problem with your AutoPlay settings in the Registry. Make sure the NoDriveTypeAutoRun setting has the value 95 00 00 00.

Removing The Drive. Whether you want to open your CD/DVD-ROM drive for cleaning or repair or completely replace it, you need to start by getting it out of the computer. First, unplug the computer's power cord and any other external cables that might get in the way. Then, open the case, usually by removing screws in the back although sometimes you must remove the front panel. Third, locate your CD/DVD-ROM drive and unplug the cables that are attached to it. Note the position and orientation of these cables for when you reinstall the drive. Next, unscrew the drive from the chassis and pull it out through the front panel. Some cases have rails attached to the drive. If applicable, pull the drive out and then unscrew it from the rails.

Take a look inside. Although you can buy a replacement CD-ROM drive for about $50 and DVD-ROM drives for about twice that, why spend the money if you can fix the problem? Pop the drive open by removing the screws that hold its case together. You may need to tear a warranty seal to find all the screws. If you want, use canned air to blow out any dust and debris, keeping the end of the can's straw at least 12 inches from the drive. Then, inspect the interior for potential problem spots such as a jammed CD, foreign objects, loose or broken parts, worn gears, or a dirty lens. If you can, fix the problems you find, but be extremely gentle when cleaning the lens because its calibration is particularly sensitive.

(NOTE: Be sure to observe the same static precautions when tinkering inside a drive as you do when working inside the PC itself, taking care to ground yourself at all times. Like opening a case, opening a drive may void its warranty.)

Replacing The Drive. Replacing a drive is basically the opposite of installing one. Mount the drive in the chassis, screw it in, connect the cables, reassemble the computer case, plug everything back in, and start it up. Pay attention to the alignment of the cables when you plug them into the drive. The data cable's marked wire must line up with Pin 1 on the CD/DVD-ROM drive. Also, if you're installing a new unit, make sure its jumpers are set up to match the old unit for the master or slave setting. LS

by William Van Winkle

How To . . .

Get USB To Work On Your PC

You're at home after having just purchased the latest racing car video game along with a driving console and an external drive to play the disc. You even bought a top-of-the-line subwoofer to hear the roar of the engine. You plug everything into the USB (Universal Serial Bus) ports on the back of the computer and sit down, ready to win your first race, and it crashes. No, not the car, your computer.

So how do you avoid troubles with USB devices, and how do you fix problems if they occur? Fortunately, USB has a big advantage over older systems with its reliably connecting peripheral devices. Although problems occur, they are not as common these days and can usually be easily fixed.

What Is USB? Before we get into troubleshooting USB problems, a general understanding of USB and its properties will help you avoid many of the usual pitfalls.

Basic PC architecture limits the number of internal and external devices that can be connected to your computer. It is not a question of merely adding more cards; it is a matter of how many of those additional cards the computer can recognize. But things have changed significantly since the 1980s when systems consisted of a processor, two 5.25-inch diskette drives, a keyboard, and a printer. Modems, mice, joysticks, CDs, DVDs (digital versatile discs), hard drives, sound cards, scanners, digital cameras, video accelerators, Zip drives, docks for PDAs (personal digital assistants) and laptops, speakers and microphones, and tape backup drives have been added to the mix. Some fundamental changes were needed, therefore, to accommodate these devices.

In response, a system was developed that lets multiple devices use a single computer address, known as an IRQ (interrupt request line). In 1995, the original specification for USB was released. The new standard had several advantages. First, it allowed for as many as 127 devices to be connected to a single port on the computer. Second, with a 12Mbps (megabits per second) data transfer rate, it was 10 to 40 times as fast as regular serial or parallel connections. USB also offered easier set up because devices could be added or removed from the system while the system was running.

Although this USB standard was released five years ago, it took several years before the software and peripheral devices to support it became widely available. The initial release of Windows 95, for instance, didn't support USB. The second release, Win95 OS/2, while it did include support for USB, did not load automatically as part of the system setup and contained various bugs. Plus there were few devices available that could take advantage of USB. This all changed in 1998, however, with the release of Windows 98. Most computer manufacturers began including USB ports in their machines and devices.

USB has four parts: the controller, one or more hubs, the devices themselves, and the cables that connect them. The controller, which identifies and manages the devices on the USB, is contained inside the PC. It includes the USB device drivers (pieces of software tailored specifically for particular devices that lets Windows control or "drive" the devices). The main, or root, hub is also located in the computer with additional hubs connected to and controlled by the root hub in a master/slave relationship.

Potential Problems. Theoretically, all you have to do to is plug in a USB device. The computer instantly recognizes it and loads the device driver. While it does work this way in most instances, there are a number of problems that can develop. We're going to take a look at a few of them and walk you through solutions when possible.

Does my system support USB? To find if your PC that's running Win98 or Win98 SE (Second Edition) supports USB, download and run the free USBReady utility from the USB FAQ section (http://www.usb.org). It examines your hardware and software and tells you what, if anything, you'll need to run USB.

What can I do about an outdated operating system? If you are trying to get USB to work on an older

What You Need To Know

Benefits
Being able to hook lots of extra equipment to your computer and have it all work properly

Time
Most of the fixes can be done in less than 5 minutes; others can take up to 30 minutes

Easy to Intermediate

Skill Level
Easy to Intermediate

$$$

Cost
Most of the fixes are free; if you need cables or hubs, they run from $5 to $100

machine, you'll probably encounter some difficulties. For best results, upgrade to Win98 SE, which has very few problems supporting USB devices.

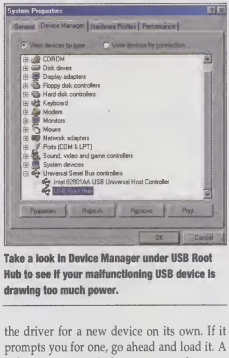
My hardware devices are malfunctioning or are incorrectly configured. When a malfunctioning or incorrectly configured device is plugged in, it generally causes the computer to stop responding. In these cases, you will have to physically turn off the computer to reset the bus. To verify which device is causing the problem, unplug and reconnect the device to see if the problems occur again. If the device is connected to an external hub, try plugging it directly into the computer instead. If you have another computer that you know to be working, plug the device into it to see if the problem occurs. Once you've isolated the offending device, follow the service instructions for that piece of equipment.

You might also try visiting the device manufacturer's Web site to see if there are newer drivers available. If there are, download them, plug in the device again, and see if that solves the problem.

Bandwidth shortage. A single USB port can handle only a certain amount of bandwidth, which it allocates between all of the active devices. A device that is hogging a lot of the bandwidth, however, can slow down or crash the bus. USB, therefore, is not designed for high data transfer items such as hard drives, DVDs, or video cameras. In such a case, move the item that needs the most bandwidth to its own USB port or get a high-speed port installed on your computer to accommodate the device. An alternative is to buy a USB switch and plug it in. This switch lets you select which USB devices are connected to the system.

Power too high or too low. USB is a powered bus system designed to operate between 50 and 500mA (milliamps). If the draw on the bus is less than 50mA, it won't even read the device. If a device tries to draw more than 500mA, the system suspends or disables that port until you turn your computer off and on again. To find out how much power is being used on a bus, go to the USB Root Hub properties in the Device Manager and click the Power tab. To get there, click the Start button, select Settings, and then click Control Panel. Next, double-click the System icon and then click the Device Manager tab on the System Properties dialog box. Click the plus sign (+) next to Universal Serial Bus Controllers and double-click USB Root Hub. In the USB Root Hub Properties dialog box, click the Power tab and then the Power Properties button. In the Power dialog box, you can see what device is drawing too much power. You can then get a powered hub or a separate power supply for that device.

Missing or malfunctioning device driver. Normally, the computer will load



Take a look in Device Manager under USB Root Hub to see if your malfunctioning USB device is drawing too much power.

the driver for a new device on its own. If it prompts you for one, go ahead and load it. A safe operating rule is to assume that any device driver that you get when you buy a device is out of date. Check the manufacturer's website for the newest version before you install the device.

Low-speed cables. There are two types of USB cables: high speed (12Mbps) and low speed (1.5Mbps). Both use the same kind of connector, but the high-speed cable has better shielding. If you use a low-speed cable to connect a high-speed device, it can result in signal distortion over long distances.

Nonpowered hubs. There are also two types of external hubs: powered and nonpowered. A powered hub has a power supply that lets you plug it into the wall. It provides the full 500mA to each of its ports. A nonpowered hub depends on the root hub in the computer for its power. If a device that requires power from the USB cable is connected to the chain downstream from a nonpowered hub, however, it will cause that hub and all of the devices down the chain to be suspended. You can solve this problem by plugging the device into a powered hub.

Duplicate devices. Normally when you remove and reconnect a USB device, the system automatically recognizes it. Sometimes, particularly with printers and modems, when you plug the device in again, it will reload the driver and duplicate devices will show up in the Device Manager. To fix it, download the latest version of the device driver from the manufacturer's World Wide Web site and install it. Delete the other device drivers for that item.

Extension cables. Never use extension cables to exceed the USB limit of 5m (meters) for high speed or 3m for low speed. Exceeding the recommended distance will cause signal loss, and the devices may not install on the system. If you need a longer connection, use a series of cables connected by powered hubs to reach up to 25m.

Connecting two personal computers. Normal USB cables have different sized ends. The A end plugs into the root hub on the computer, and the B end plugs into the device or another hub. There are also cables available that have A connectors at both ends. Although they look like they would be used to connect two PCs, never do that. When using one of these cables you are connecting the power supplies of the two computers together, possibly destroying both machines and creating a fire hazard. Instead use a device called a USB bridge to do the job.

For More Information.

The above advice will handle most of the problems you may encounter with USB ports or devices. There are, however, problems that can creep up with specific pieces of computer equipment. Online support is available for most of them. Start by checking the manufacturer's World Wide Web site to see what solutions the company has posted. The Microsoft support Web site at http://support.microsoft.com also has extensive data on both generic and device-specific troubleshooting. If neither of these have the answer you need, go to the USB support bulletin board at the USB Web site (http://www.usb.org) and post your problem there. LS

by Drew Robb

How To . . .

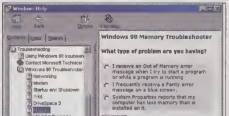
Solve 'Memory Not Found' Errors

Imagine if you couldn't remember your day-to-day and minute-to-minute tasks because your brain's short-term memory was incapacitated. It would be like the rare occurrence when you walk into a room and forget why you are there. (For some of us, however, such occurrences aren't so rare.) Performing any tasks—let alone surviving—would be extremely difficult. Even if all the other parts of your brain were functioning normally, they wouldn't be of much use to you.

Without your brain's short-term memory, you couldn't function. It's the same for your computer's RAM (**ran**dom-access **memory**). RAM is similar to your brain's short-term memory. If you receive a dreaded Memory Not Found error during the computer's boot process, your PC becomes a bulky piece of desk art.

You can fix such errors though, giving your PC back its short-term memory and making it useful again. We'll discuss some common scenarios under which you'll receive this error, and we'll help you rectify this forgettable situation.

What You'll See. If you receive a memory error, it should occur early in the boot process. Immediately after turning on the computer, you'll usually see the memory test with sequential numbers increasing extremely quickly. If you have 64MB (megabytes) of memory, you should see that the memory test number ends slightly higher than 64,000K. (*NOTE: Some Windows 98 systems skip the memory test when you select Restart from the Shut Down window. Other systems hide the memory test behind a window.*)


Windows 98 Memory Troubleshooter
What type of problem are you having?
I receive an Out of Memory error message when I try to start a program or while a program is running.
I frequently receive a Parity error message on a blue screen.
System Properties reports that my computer has less memory than is installed and...

The Windows 98 Memory Troubleshooter might help solve your RAM problems.

If you're having a memory problem, you might see a memory error during this testing process. The memory-related error messages you might see include Bad Memory At, followed by the physical address; Windows Protection Error; Parity Check, followed by 1 or 2; Fatal Exception Error, followed by several digits; or Error 201.

Many times the computer will halt the boot process when it encounters a memory error. If your PC manages to boot into Win98, run the Memory Troubleshooter to track down your problem. To open the troubleshooter, click the Start button and then Help. Click the Contents tab, Troubleshooting, Windows 98 Troubleshooters, and then Memory. Then just follow the on-screen directions.

Installation Problems. Most Memory Not Found errors occur immediately after you add RAM to your system. Several RAM chips nearly always are mounted on a small circuit board called a **memory module**. You must insert the memory module into the RAM slot on your motherboard. Because of the awkward manner you must use to install a memory module, it's easy to not press it all the way into the RAM slot or to incorrectly align it. If you believe this is the source of your error, reinsert the memory module. If you're having a great amount of difficulty installing a module, you may want to solicit some help from a computer-savvy friend or a computer technician.

Make sure you consult your PC's manual regarding the types of memory modules it can accept. Inserting the wrong type of memory module could result in a Memory Not Found error or could leave the computer locked up.

You might not always receive a Memory Not Found error when you're having problems with your RAM. For instance, you may have installed 96MB of memory, but at startup, your PC finds only 64MB during its memory test. The PC may operate properly despite not finding all the memory. As we discussed earlier, you may not have tightly inserted one of the memory modules. In other instances, especially in older PCs, you may have installed the modules in an improper sequence or in the wrong amounts. Other PCs won't let you remove some of the modules included with the original setup; check your manual for any restrictions.

Random Errors. Even if you haven't recently installed any memory modules, you could receive a memory error after installing hardware inside your PC's case. If you loosened or broke a module while installing the other component, you may receive the error.

If you receive a Memory Not Found error and you haven't opened the PC case, you could have a malfunctioning memory module. This is a rare error with newer modules, but memory modules are especially susceptible to damage from static electricity. If it occurs, you'll have to replace the modules one by one until you find the malfunctioning one. You also could have the modules tested by a technician. If you can't find a bad memory module, this type of error also can indicate a problem with your motherboard. LS

by Kyle Schurman

What You Need To Know

Benefits
Make sure your PC is finding all its memory

Time
Depends on the complexity of the problem, 5 minutes to a few hours

Intermediate to Difficult

Skill Level
Intermediate to Difficult

power this triumphant
now available in a battery
Energizer e²
the battery with a heart of titanium
energizer e² TITANIUM
take power to the next level™

How To . . .

Deal With Warranty Problems

When you buy hardware or software, you generally assume that it will work as promised. But things aren't always perfect, and that's why hardware comes with a warranty. A warranty is the company's guarantee that the item will work as intended for some minimum period, usually from 90 days to a year.

You'll need to read the warranty to make sure what it covers and for how long, and generally there's a card to return to activate the warranty. Sometimes you can register online and activate your warranty that way.

If you have mailed in your warranty card but don't have the warranty information, contact the manufacturer for your item. You may find the warranty information on their Web site, but not all companies will post that information, especially if they have dozens of products. If you've mailed in your warranty card, you should be listed in the company's database.

If you are within the warranty period and the company covers your item for what went wrong, the company will either replace or repair the defective product. Sometimes the manufacturer will ask you to return the item to the store where you bought it; other times you will have to carry the item to an authorized repair shop or pay to ship the merchandise back to the manufacturer.

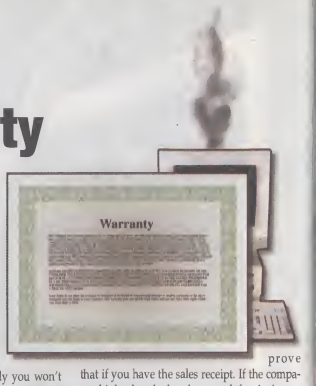
Make sure you get a tracking number for your item so that you can prove it was sent and when it arrived. You may also want to insure your item in case it gets lost in transit, but normally you won't do this unless the item is an expensive one. You will probably have to bear the cost of shipping or other transportation yourself since warranties don't generally cover that cost.

If you didn't return your warranty card, you may be out of luck. Contact the manufacturer anyway. If you have your store receipt or if you used a credit card, you can verify the date the item was bought. This might help you establish that the item in question is still under warranty. The company may have some idea of when the item was sold just by checking the serial number and shipped dates in their own files. And it's possible that the company may wish to help you simply because they're concerned for their customers and want you to be satisfied. Don't give up without at least attempting to get the defective item replaced.

On the other hand, you may find that you're up against a company that tries not to live up to the warranty agreement, even if you returned your card and have all your paperwork in order. What can you do in this case?

First, make sure you're keeping notes on all your conversations with the customer service department. Note who you spoke with and when, and what they told you about the merchandise and the warranty. If the customer service department refuses to help you, move your complaint to a higher level of the company, either to the head of the customer service department or to another higher manager, all the way up to the company president if necessary.

If there is a question about whether your item is still under warranty, you can easily prove that if you have the sales receipt. If the company thinks that the breakage or defect isn't covered, make sure you know why (for example, some warranties only cover moving parts). The company may believe that the damage is your fault, in which case they won't want to replace the item.



Warranty Disputes. If you believe the defect should be covered under warranty and no one in the company is willing to make good, you still have a few options. First, contact the consumer complaint division in your state and the state where the company does business. If the state agrees that your warranty has been violated, it will help put pressure on the company to make good on your claim. Again, having all your paperwork in order will be key to getting satisfaction.

If your local newspaper or TV stations have consumer advocates, you may want to contact them as well. The threat of bad press can bring a company in-line sometimes. You can also write *Smart Computing*'s Action Editor for help at editor@smartcomputing.com or Action Editor, PO Box 85380, Lincoln, NE 68501-5380.

Your last resort would be to take the company to small claims court (assuming the loss is under the small claims limit, usually $1,000 or $2,500 depending on your state). You may have to sue in the state where the company is headquartered, which can be an inconvenience, but you won't need an attorney in small claims court. LS

by Jennifer Powell

What You Need To Know

Benefits
Get faulty hardware or software replaced by the manufacturer

Time
The product may be replaced in a few days, but disputes can drag on indefinitely

Skill Level
Easy

How To . . .

Solve Common Windows Error Messages

The first time Anna Bellin saw a Windows error message, she thought she killed her PC. The 39-year-old artist was reading e-mail when her monitor inexplicably switched to a blue screen crammed with gobbledygook.

"I clearly remember thinking, 'Great, I killed it,' and when the keyboard went dead, I really started to panic," she says. "I finally called a girlfriend in tears. Imagine my surprise when she started laughing and said, 'Welcome to Windows.' "

Eventually every computer user will receive a cryptic note from Windows warning that some type of error has occurred inside your PC. And no matter whether you're a PC novice or computing whiz, your heart will skip a beat, your breath will catch in your throat, and doomsday scenarios will run amok in your head.

The good news is that most Windows error messages are simple to fix. Others require a bit of tinkering to resurrect a wounded application or a dead device. How can you tell which is which? Ah, there's the rub. There is no master error message list. No sacred scroll that details every error message and what caused the problem and then bestows magical solutions.

If that wasn't bad enough, Windows error messages are often misleading, and many have nothing to do with the actual problem, warns David A. Karp, author of "Windows 98 Annoyances" ($24.95, http://www.annoyances.org).

For example, a common error such as Anna's BSOD (blue screen of death) means something caused your hardware and software to lock up. While ominous in nature, chances are it's a one-time computer glitch and nothing to fret about. To fix it, simply turn off your PC and power it up again.

If, on the other hand, this or another problem persists, an application won't open, or your computer won't start, you don't need to call the Psychic Friends Hotline to know your future will contain a few hours of troubleshooting.

So what do you do when Windows goes kablooey? We've talked to troubleshooting experts and scoured online resource sites to zero in on how to solve the most common Windows error messages.

What You Need To Know

Benefits
Recognize, understand, and quickly repair error messages.

Tools
Phillips or flathead screwdriver; PC toolkit; third-party utilities, software, and device driver updates optional

Time
Varies from a few minutes to hours

Skill Level
Easy to Difficult

Cost
$$$ Free for most; about $100 for third-party utilities

Stuck In Windows Trap. Not all error messages are bad. In fact, Karp says many are good. "An error message means a programmer thought ahead of time and anticipated a problem and thought to write a canned response," Karp explains.

Like a shepherd herding a flock to a certain destination, a prewritten response to a trapped error message generally means the problem is something the user has done wrong vs. a glitch in the hardware or software. In most cases, Windows will tell you what the problem is: you've run out disk space, a file is missing or corrupted, or any other similar problem.

Untrapped errors, on the other hand, are generally the result of a software or hardware bug. Typically, a bug is an error in coding or product design that causes computer hardware or software to behave unexpectedly or crash. Every hardware and software product ships with bugs, so if you haven't encountered one yet, you will.

"Error messages caused by untrapped errors are more cryptic," Karp says. "You can quickly spot an untrapped error because it's often accompanied by a list of numbers accessible by clicking the Details button."

Usually error messages such as page faults, illegal operations, and fatal exception errors are caused by a bug in software, where an application or driver tries to use part of your memory that is currently being used by another program, Karp explains.

The following third-party services will help you keep current on bugs, bug patches, and bug fixes: BugNet (http://www.bugnet.com), Frank Condron's World O'Windows (http://www.conitech.com/windows), Windows 98 Annoyances (http://www.annoyances.org/win98), and WinPlanet (http://www.winplanet.com/winplanet).

Of course, not every problem has an error message. For example, when an application freezes, Windows doesn't display an error message. This computer rite of passage is called a "crash." In most cases, you can close the halted

application without having to reboot Windows, though expect to lose whatever you were working on. (At least whatever information was input after the last time you saved the file.)

The solution: press CTRL-ALT-DEL. Look for the words Not Responding next to the frozen application in the Close Program dialog box. Highlight the offending application, then click the End Task button. In some instances, another Window will appear, informing you that the program is not responding properly. Click End Task. If the application closes, go into every other open program, save your work, and exit Windows. Then restart, as Windows may have become unstable when the initial application crashed.

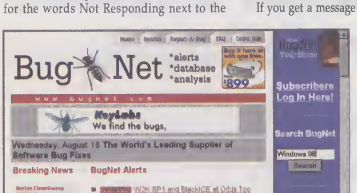
If the frozen application does not close, see if Windows will let you switch to the other open applications (if mouse clicking fails, try using the ALT-TAB keys), save your work, and exit using Start, Shut Down, Restart. If the application continues to freeze, call the manufacturer and see if it's familiar with the problem and has a fix.

While it's easy to blame Windows whenever there's a problem, in many cases it's what you run on top of Windows that can make it unstable, slow it down, and cause a crisis. Karp says it's difficult for inexperienced users to understand that an error message such as Rundll32. This Program Has Caused An Illegal Operation And Will Be Shut Down could be the result of a missing file in your System.ini or any number of other scenarios.

"Instead of wondering how to fix the problem, inexperienced users wonder how the file could simply vanish from their hard disk," Karp says. "Obviously, they feel they did something wrong, instead of realizing another program could have removed or renamed the file, the file could have become corrupted during an illegal shutdown, or any number of software manufactured problems."

If you get a message you don't understand, the first step is to copy it down either by hand, or, if you're computer is working, press PRINT SCREEN to take a snapshot of the entire screen. While it might not make any sense to you, the first two lines can prove invaluable to a Windows tech answering a support call.

To quickly find out what an error message means, Karp advises to plop the entire text into a search engine such as AltaVista. Chances are you'll find that someone else has already experienced the same problem, solved it, and written about it in a discussion group or tips page.



Third-party services such as BugNet will help you keep current on bugs, bug patches, and bug fixes.

■ Common Windows Problems & Solutions.

Windows users re-port that the majority of operating system problems can be traced back to poor installation; out-of-date, conflicting, or missing device drivers; or missing system files that were accidentally deleted or never installed. Other Windows error messages occur when two or more programs smack into each other with disastrous results.

There are so many error messages that not even Microsoft can keep track of them. However, here are 10 of the most common Win-dows error messages and solutions. Keep in mind, these solutions are only valid if the corresponding problem happens repeatedly. A single occurrence usually doesn't mean anything, Karp says.

Illegal Shut Down

Similar to frozen applications, this is where a program such as Internet Explorer suddenly stops working and, instead of freezing, simply shuts down. This happens when the program performs an illegal operation—a command Windows doesn't like or understand.

Solution: In most cases, you can simply restart the application. A safer solution is to reboot the system, then see if you can duplicate the situation that caused the program to suddenly shut down. If the program works, don't worry about it. However, techies say you should make a note of the problem just in case it happens again. Their motto is "Once is a glitch, twice is a trend." If the application continues to close down or works erratically, call the maker and check for software or driver updates before calling tech support.

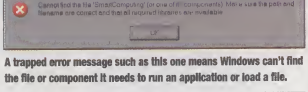
General Protection Error

These usually occur running older Windows programs that, for some reason, are having a problem running under a newer Windows version.

Solution: Contact the software publisher and see if there's an update or new device driver that will get the program to behave under the newer operating system. Follow the same strategy if your mouse, printer, monitor, or any other hardware component suddenly conks out or doesn't work properly after you've installed a new piece of software.

Insufficient Memory Error

There Is Insufficient Memory To Run This Application. This error message implies that you don't have enough memory to run an application. But the error, in fact, is insufficient GDI (graphics device interface) resources. It's caused when a program is closed down but fails to relinquish all of its resources.


SmartComputing
Cannot find the file 'SmartComputing' (or one of its components). Make sure the path and
filename are correct and that all required libraries are available
OK

A trapped error message such as this one means Windows can't find the file or component it needs to run an application or load a file.

Solution: Save your work and shut down as many programs as possible. Restarting your system flushes everything out of memory. A better solution is WinRamTurbo ($19, http://scselp.com/winramturbo), a handy utility that runs in the background maximizing memory performance. When an application fails to release system resources, WinRamTurbo springs into action reclaiming stolen memory. If the problem persists, check the publisher's Web site for a software update, patch, or fix.

Too Many Drivers

If you've just installed a new piece of hardware, and another hardware device stops functioning, the problem could be as simple as Windows loading the old driver and the new one and both fighting for control.

Solution: To remove the old driver, right-click My Computer, select Properties, and then click the Device Manager tab. Click the plus sign next to any item to see a list of installed devices. For printers, select Ports. If both device drivers are listed, highlight the old one, click the Remove button, click the OK button, exit out of Windows, and restart. If that doesn't solve the problem, try repeating the process in Safe mode. Restart your computer and press the F8 key (or another key as indicated on-screen) as soon as you see the words Starting Windows. After Windows boots in Safe mode, follow the same instructions as above.

Digital Traffic Jams

Scary sounding error messages such as Network Connection Was Refused By The Server or Too Many Connections or Failed DNS Lookup could be as simple as a mistyped URL (universal resource locator) or a digital traffic jam. Getting through to a popular site is just like trying to call in to talk radio. There are only so many incoming lines, so you have to wait until somebody leaves and a connection frees up before you can get in. This is especially problematic when big companies such as Microsoft and America Online release product updates, patches, and new releases.

Solution: Your only recourse is to keep trying or to wait until a less busy time.

Can't Move

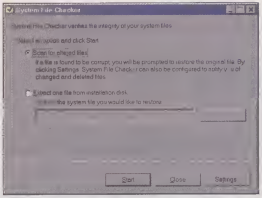
If you drag a folder icon onto itself in Windows Explorer's tree view, you'll see Cannot Move [*folder name*]: The Destination Folder Is The Same As The Source Folder.

Solution: You can't copy or move a folder on top of itself.

Don't Copy That

A File Being Copied Is Older Than The File Currently On Your System. This message usually appears when installing hardware or software. It's warning you that you're about to overwrite a newer device driver or file with an older one.

Solution: Click Yes to skip copying the older file in favor of the new.



Windows 98's System File Checker can scan for altered or corrupt files and then restore the original file.

Oops, Where Is It?

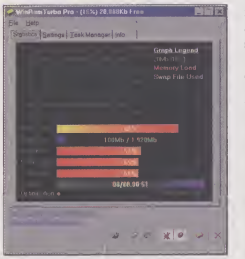
Cannot Find The File [*file name*] Or One Of Its Components means Windows can't find the file or component it needs to run an application or load a file. *Tip:* It can also mean the file name is misspelled, that part of an application is missing or corrupted, or you're out of system resources.

Solution: Make sure the path and file name are correct and that all required libraries are available. Libraries are essential support files that come with all applications. If one is missing or corrupted, you'll need to reinstall the application in question. Check spelling. Use Window' System File Checker to scan for altered or corrupt files.

Active Desktop

The Wallpaper You Selected Can Be Shown On The Desktop Only If Active Desktop Is Enabled. Do You Want To Enable It? This means the picture of Wolverine that you want adorning your Desktop will only work if you turn on the Active Desktop.

Solution: If you're not using Active Desktop, don't start. Find another graphic. If you are using it, click Yes.



When an application closes and fails to relinquish all of its resources to Windows, utilities such as WinRamTurbo spring into action and reclaim stolen memory.

Pop The Floppy

Invalid System Disk. Replace The Disk And Press Any Key. It sounds sinister, but it's merely Windows telling you that something—in most cases a diskette—is preventing it from starting or rebooting.

Solution: Check the diskette drive and remove the diskette. If it still won't boot, use an emergency diskette to start Windows and scan for viruses.

■ **Last Ditch Check List.** You've rebooted, checked the cables, and run Windows' troubleshooting Wizards. If you can get online, check out the hardware or software Web site of the guilty party. If that doesn't work, hop over to third-party support sites such as PC Pitstop (http://www.pcpitstop.com), Computing.Net (http://www.computing.net), or ePeople (http://www.nowonder.com).

If you can't get online, try these last-ditch solutions before throwing yourself at the mercy of technical support.

Make it safe. If Win98 isn't working, try starting up in Safe mode, which lets you start Windows in a "hobbled" mode where certain hardware drivers aren't loaded. If your PC starts and applications work, the guilty party is a device driver stashed in a system file such as Win.ini or System.ini.

Bad product. If new software or hardware is the problem, uninstall it. If the problem disappears, go to the maker's Web site or call tech support.

Ask the program. Most software has a comprehensive, indexed help section. Pressing the F1 key or clicking Help works in every Win98 application. Win98 also comes with an arsenal of troubleshooting wizards. To find them, click Start, Help; select the Index tab; and type **troubleshooting** in the Find field.

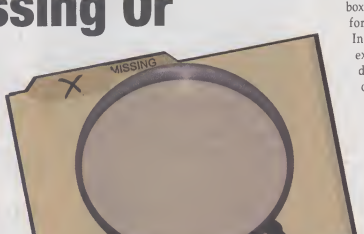
Read the manual. When all else fails, be sure to read the manual. It's amazing what you'll find in there.

Join a group. Bribe your favorite gearhead. If you don't have one, join a user group. To find one near you, call a local computer store or visit the site for the Association of Personal Computer User Groups at http://www.apcug.org. LS

by Michael Cahlin

How To . . .

Find Missing Or Deleted Files



We've all done it. Every one of us has, at some time or another, deleted a file and later wished we hadn't. Or we have come across a warning in a dialog box that says, "Cannot find a file needed to run this program." Anyone who has downloaded a file from the Internet and failed to note where it was saved on the hard drive knows the value of being able to locate a missing file. Here, we show you how to locate a missing file or recover one that you have accidentally deleted.

Sometimes your recovery quest will be easy, and sometimes you'd have more luck raising the dead than restoring the file. We'll show you when it's worth spending a little time and resources and when to give up. We'll also show you some tricks that will help keep your data safe from prying eyes after you think you have removed it from your computer.

What You Need To Know

Benefits
Finding lost files saves the trouble of recreating them. Replacing missing files can keep programs running.

Time
Just seconds for a simple search of your drives

Skill Level
Easy to Difficult
Easy: File search and file recovery from Recycle Bin. Difficult: File recovery from the Recycle Bin

Cost
$$$
File recovery is free. Recovery and deletion utilities vary in price

■ **Missing Files.** A file classifies as "missing" if the program you are attempting to run can't find it or if you simply can't remember where you placed it on the hard drive. When you install a program in Windows 98, it places many files on your hard drive. These include virtual device driver (identified with the extension .VXD) and dynamic-link library (.DLL) files. If you move a program, you may change the path to these components, prompting message such as "Cannot find file C:\PROGRAM NAME \PROGRAM LOCATION\XXX.DLL needed to run this program." Righting this problem means locating the file and changing the path so that the program can find it again.

The first tool to locate a missing file is right in the Windows Start menu. You can use the menu's Find Files Or Folders option (under the Start menu's Find listing) to locate a file as long as you know at least part of its name. Using Wild Cards (see explanation below), you can search for the file on your hard drive or any other storage medium that has a normal FAT (file allocation table), including removable media such as CDs, LS-120 or Zip disks, or even regular diskettes. Enter the name of the file you are looking for in the Named: box or the text you are looking for in the Containing Text: box. The third box lets you choose where to look for the file, and checking the Include Subfolders box will examine the contents of any directories nested within the one you choose to search.

You don't necessarily have to remember the name of a file to find what you're looking for. By clicking the Date tab at the top of the search screen, you can choose to search for files that were created, modified, or even last accessed between certain dates or within the last several days or months. By using this in combination with the first screen and even the features under the Advanced tab, you can narrow your search even further.

■ **Wild Cards.** If you can't remember the full name of the file you are looking for, or if you want to find files of a certain type, a wild card will make your search a lot simpler. For example, if you are looking for the file Monopoly.exe, but you can only remember that it starts with the letter *M*, typing M*.exe will find all program executable files that start with *M*. One search we conducted with this criterion found 88 files, including the Monopoly program. Obviously, the more information you can give, the better the results will be, but you can narrow down your search using this simple tool.

■ **Secrets Of Deleted Files.** New hard drives store files in the order they're saved, with the most recently saved file placed at the end of the used part of the drive. Once you start deleting files, however, gaps appear in the available storage space. If those gaps are large enough, they're used as needed.

When you erase an item, it is not removed from the hard drive but from the FAT, which is a table housing information about all of the files stored on the hard drive. Think of it as an index that isn't part of the file itself but a valuable guide to where to find it and what it is. When you delete a file, all the data in it remains, even after you take steps such as

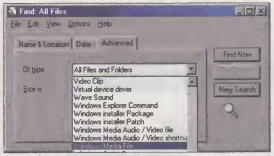
emptying Win98's Recycle Bin. Windows does this by replacing the first letter of the original file name with a symbol (usually a tilde, ~) and hiding the file from the system. Although the file disappears from directory listings you see, the information stays on your hard drive until it is overwritten by anything else stored on the drive subsequently. Provided nothing has been added to the area holding the file, you can usually recover a lost document. This can be an advantage if you delete something accidentally or a real problem if someone else is retrieving confidential information you thought you deleted.

Saved By The Recycle Bin.

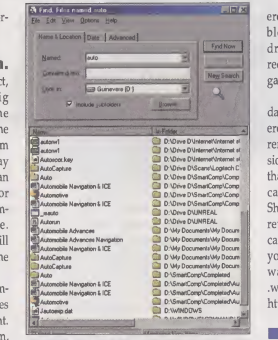
Though most of us know Win98 isn't perfect, it has some nice features that are big enhancements over Windows 3.x. The Recycle Bin is one of them. Right-click the Recycle Bin icon and select Properties from the options that pop up to customize the way Windows handles deleted files. Here you can determine the amount of space to be used for temporary storage of deleted files. We recommend leaving these settings as they are. When you reach the limit, a dialog box will appear and offer you the option to clear the waste before continuing.

Files in the Recycle Bin are not deleted completely until you empty the trash, which makes it very easy to restore lost data up to this point. If space on your hard drive is at a premium, however, and you can't afford to let files pile up in the Recycle Bin, you can change the settings so that anything you decide to delete is removed immediately. In the Properties dialog box, check the box marked Do Not Move Files To The Recycle Bin. Remove Files Immediately On Delete. This risky option precludes easy file recovery, so use it only if you're certain you know what you're doing.

Recovering a file you have accidentally deleted, provided you have not yet emptied the Recycle Bin, is easy. Simply open the Bin by double-clicking its icon. A list of the files inside will appear. Now you can drag and drop the file back onto the hard drive or even the Win98 Desktop with no loss.



The Advanced features of the Windows Find option make it easy to locate files of a certain type.



Searching for a specific text string, such as "auto" in this example, can produce a long list of files found on your drives.

After you have emptied all deleted files in the Recycle Bin, recovery is a little more difficult. You'll need a third-party program such as Norton Utilities, ($49.95; 800/441-7234, 408/253-9600; http://www.symantec.com), which includes a program called Norton Unerase that can recover a recently deleted file. If you have written to the drive in the meantime, however, recovery will be more difficult. The small shield that appears on the standard Recycle Bin is the main clue to the addition of Norton Protection. Right-clicking the Norton Protected Recycle Bin brings up the Unerase program that lists recently deleted files along with the probability of successful retrieval.

Is It Really Gone?

If you work with sensitive information, you may need to ensure that a file can't be recovered after deletion. The solution is to scramble the selected data stored on your hard drive, ensuring that anyone who tries to recover the file will obtain only meaningless garbage.

Several programs will scramble and encrypt data for deletion so that it can never be recovered. Shredder95 lets you select files and then remove them from a list. The shareware version will let you wipe 20 files before insisting that you register the software for $29.95. You can drag and drop files into the main Shredder window and get a final chance to review them before deletion. Of course, you can customize the program to run the way you want. You'll find this and other shareware encryption programs at http://www.winfiles.com/apps/nt/file-cleanup.html or http://www.download.com.

Removing Programs.

As we explained earlier, when you install a program in Windows, many files settle onto your hard drive, and even using the Control Panel's Add/Remove Programs option or an uninstall program supplied with the software doesn't always a guarantee that all of the associated files are removed.

You can search for any left-behind files that have at least part of the original program name by using the partial search as described above, but you may still miss some that have a different name. A commercial program such as Norton CleanSweep ($39.95) will remove these files cleanly and reasonably safely. Be careful when removing any files that are flagged as possibly being shared by other programs. We recommend that you move these files to the Recycle Bin and store them for several days to make sure that nothing else needs them before you take them off your system permanently. LS

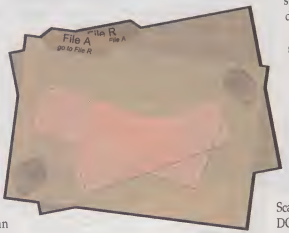
by Tony Kaye

If you work with sensitive information, you may need to ensure that a file can't be recovered after deletion. The solution is to scramble the selected data.

How To . . .

Fix File Problems With ScanDisk

When you end your computing session, you are supposed to shut down Windows properly. This means going to the Start menu, selecting Shut Down, and clicking OK. This process is necessary because some elements of the operating system are retained in memory and must be written to the hard drive before everything can be correctly shut down. Of course there are times when your computer locks up or other errors prevent you from closing down properly, which can leave "broken" files on your hard drive. The operating system uses spare hard drive space to store work in progress, such as text not yet saved through your word processing program and other files that don't need to slow the system down by being saved immediately. They are stored invisibly to the user and cannot be seen by the drive's FAT (file allocation table).



Fortunately, Microsoft has been dealing with this problem for some time; it builds a program called ScanDisk into Windows for this purpose. ScanDisk is designed to find and help restore these lost files or clusters, bringing them to at least a state where you can identify them and have a shot at recovering the data contained within.

If you have owned your PC for more than a week or two, you have almost certainly seen the DOS version of the program running, as it will start automatically (after an on-screen prompt) following incorrect shutdowns. Some PC manufacturers configure Windows to run ScanDisk every time the PC starts up to make sure there are no obvious disk problems before you begin your computing session. The message will read "Windows was not properly shut down, one or more of your disk drives may have errors on it." The program will then proceed to check your hard drive (or drives) for errors and report any problems to you. Lost clusters can be saved as a file with the name File00X.chk, where X is the next available number following any other recovered files that have not been deleted, so the first will be 1, the next will be 2, and so on.

You can examine the recovered files using a text editor such as Windows' Notepad and replace the data in its original location using the cut and paste options. However, if the clusters refer to a program or associated .DLL, .VXD, or other file, you will probably need to reinstall the product to restore it to its former glory. You can usually identify the type of file by examining the contents. If the characters you see appear to be garbage or random characters, then you obviously do not have any text you can recover. In this case, start any of the programs you had running when the crash occurred and, if they all perform correctly, you can delete the file. We suggest leaving it in the Recycle Bin for a few days to make sure that nothing is missing.

If when running a program, you get a message telling you that a file is missing, you can try renaming the lost cluster to the name of the missing file and then attempt to run the program again. Be forewarned that this solution rarely works. You'll probably have to delete the clusters and reinstall the program.

Running ScanDisk From Windows. If errors are reported on your hard drive, one way of fixing them is to run ScanDisk from Windows rather than letting the DOS version deal with them. This gives you greater control over how the files are handled by letting you set the options before you run the program. Choose Ignore when the errors are originally reported by the DOS version and then run the program after Windows starts up. You'll find it under Start, Programs, Accessories, System Tools along with a number of other useful utilities described elsewhere in this issue.

You can perform two types of tests on your drives. The first is Standard, which checks the FAT, along with files and folders. The Thorough test performs these functions, as well as scanning the disk surface. This takes a considerable amount of time, so we recommend performing this test before you go to bed or leave the computer because you should not operate the PC while the test is running. For unattended operation, you can tell the program to fix errors automatically. When it finishes, you have a summary dialog box explaining what went on while you were gone.

Clicking the Advanced button shows the options available when running ScanDisk. You can choose how the program deals with specific problems and how, or even if, it reports them to you.

It's wise to run the program periodically to make sure that your hard drive is in top shape and is not harboring any major problems ready to jump up and bite you when you least expect it. LS

by Tony Kaye

What You Need To Know

Benefits
Checking the status of a hard drive keeps it in shape and prevents errors from causing problems later. It also helps you recover lost files caused by an incorrect shutdown.

Time
As little as 30 seconds for standard scans, up to several hours for some thorough scans

Skill Level
Easy to Difficult

Simple scans: Easy; File recovery: Intermediate to Difficult

How To . . .

Check For System File Errors

Windows 98 works closely with the system files that it needs to run the operating system and applications. Occasionally these files get corrupted for any number of reasons, such as a hard drive issue or a system crash, but whatever the reason, a bad system file can cause problems running your programs or even result in complete program crashes. Sometimes these valuable files even get deleted inadvertently, which can also cause problems for an application or the entire operating system.

When you're working with valuable data, the last thing you want is a sudden crash and data loss for no apparent reason. After the crash occurs (particularly more than once), you may begin to wonder if something is wrong. One culprit could be one or more bad system files. Yet, with the large number of system files in Windows, how can you determine which one has gone bad? Win98 includes a small utility called System File Checker to help you out.

Launching Help. Your first step is to run System File Checker, which you can access from the System Information utility. Click Start, Programs, Accessories, System Tools, and System Information. When the System Information window opens, click System File Checker from the Tools menu. You could also open System File Checker by clicking Start, Run, and typing **sfc** in the Open field.

With the System File Checker open, your next step is to run it and check for missing or corrupt files. Before you use it, you should be aware that not every file it finds may actually be corrupt. In some cases, Win98 may simply not recognize the component as a match for the file information in the System File Checker's data file. In addition, System File Checker might find some files that it recognizes as having changed from the original. This is also perfectly normal because users often update system files. For these occasions, System File Checker includes an option to update or ignore these files.

To begin, leave the default selection of Scan For Altered Files. This means the utility will search for any missing or corrupt files and prompt you when one is found. (The other option allows you to enter a specific file name if you know it.) Click Start, and the System File Checker begins searching for missing or corrupt files. A standard blue status bar indicates the utility's progress.

When a problematic file is found, Win98 displays a dialog box with the name of the file and three options.

- **Update Verification Information:** Use this option when you know you have updated the file. System File Checker updates its configuration file and won't prompt you on this issue again.
- **Restore File:** This is the default choice that lets you locate the missing or corrupt file and replace it.
- **Ignore:** Use this option if you want to ignore the message because, for example, you are not sure if the file is a problem or not. The System File Checker will prompt you again regarding this file the next time you run the utility.

If you choose to restore the file, System File Checker prompts you to select the correct file. You will need to check various locations, such as your Win98 Installation CD-ROM or WINDOWS/SYSBCKUP directory, for the faulty file. Win98 backs up many system files in this directory to help you recover them in just such an emergency. If you locate the file, click OK and Windows replaces it. If you cannot locate the file, click Cancel, and then click Ignore. You can try to locate the file elsewhere on your system by doing a search (click Start, Find, Files Or Folders), or looking for it from a hard drive backup (another good reason why you should back-up regularly).

You can continue to review files that System File Checker reports in this same fashion. If you have never run this utility before, you may encounter quite a few problematic files the first time through. Click Close when you're finished working with System File Checker.

Use To Your Advantage. If your system is not behaving normally and you encounter frequent system or program crashes, you may have a faulty or missing system file. The System File Checker is a useful tool to help ferret out these corrupt or missing files and replace them with a good backup. System File Checker is not foolproof, but it is a key diagnostic weapon for any Win98 user. LS

by Ron Miller

What You Need To Know

Benefits
Find and replace missing or corrupt system files

Tools
System File Checker utility

Time
5 minutes to more than 30 minutes, depending on the number of problem files found

Skill Level
Intermediate

How To . . .

Remove Items From Your System Tray

Waiting for your computer to boot up each day is a tiresome process. A quick and cheap way to speed up this process is to remove some items from your System Tray.

The System Tray. In the default setup, the System Tray resides at the bottom right corner of your Windows 98 Desktop. It is the rectangular box that usually includes a small clock and a yellow volume control icon. The items in the System Tray start every time you boot up your computer, slowing down the boot-up process. They then run in the background, eating up precious system resources. If you see more than three or four icons in your System Tray, you can probably remove some of the superfluous programs. This will shorten up your computer's boot time, and it may give your computer a performance boost.

First, let's review how the program icons get into your System Tray. Many programs install themselves into the System Tray so they start faster, and it is easier for you to access them. In certain cases, this makes perfect sense. For instance, you may find an icon for your antivirus software in the System Tray. That's good because your antivirus program should be constantly on guard. You also may find an icon for a utility such as an uninstall program. Again, that's good because it will monitor all the programs you install so you can properly uninstall them later.

System Configuration Utility. Many programs in the System Tray are not necessary, and you can remove them without detriment to your system. Win98 comes with an easy-to-use utility to accomplish that task: the System Configuration Utility.

The easiest way to access the System Configuration Utility is to click the Start button, choose Run, type **msconfig** (for Microsoft Configuration), and press ENTER. You also can access the System Configuration Utility by following a more indirect route. Go to the Start menu, Programs, Accessories, System Tools, and System Information. From the Tools menu, select System Configuration Utility.

In the System Configuration Utility dialog box, click the Startup tab. You will see a list of the programs in the System Tray. Information in the Startup tab comes from the Win98 Registry, as well as from items in the Startup menu under Programs. You don't have to be a sophisticated user to change these items. Each one has a checkbox and clicking a box with a check mark removes its check and prevents that item from loading when the system reboots. Remove the check from any items you do not want to start. Click the Apply button and then OK. Answer Yes when Win98 asks if you want to restart your computer. When your Windows Desktop reappears, you will notice the item(s) you unchecked no longer appear in the System Tray.

It is not always easy to know the function of the programs on the Startup tab. Often a little investigative thinking is needed. For instance, if a program has the words "Norton" or "NAV" in it, it is probably linked to the Norton AntiVirus program. Don't get apprehensive about removing programs because it is easy to reverse your actions. If you remove something, and you later find you need it, simply return to the System Configuration Utility, recheck the box, and restart your PC.

Remove Default Icons. The default installation of Win98 puts two icons in the System Tray that you don't see in the System Configuration Utility: the Volume Controls and clock icons. To remove the Volume Controls icon, right-click the icon, choose Adjust Audio Properties from the pop-up menu, remove the check mark from the Show Volume Control On The Taskbar option, and click OK. To remove the clock icon, right-click the time on the System Tray, choose Properties, uncheck the Show Clock box, and click OK.

Quick Tray. Once you clean out your System Tray, you may want to use Quick Tray. This customizable utility enables you to use the System Tray for your own items, including your favorite programs, documents, and Web addresses. To take advantage of this utility, you will need to install the Win98 Resource Kit. Insert your Win98 CD-ROM. When the Windows 98 CD-ROM window opens, click Browse This CD. Open the TOOLS folder and then the RESKIT folder. Double-click the Setup icon (Setup.exe not the SETUP folder). Win98 will walk you through the installation.

Once you install the Resource Kit, click the Start menu, Programs, Win98 Resource Kit, and Tools Management Console. Find the Quick Tray listing (in the Qs in the TOOLS A TO Z folder) and double-click it. This will put an icon in the System Tray. Click this new icon to bring up a window that will let you add and remove your own System Tray items.

Practice. Be sure to try these new techniques. Mastering the System Tray is an easy task with great rewards. LS

by Sandy Berger

What You Need To Know

Benefits
Make your computer boot up faster and save system resources

Time
5 to 10 minutes

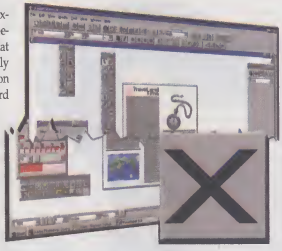
Skill Level
Easy to Intermediate

How To . . .

Close Crashed Or Frozen Applications

Nothing is more frustrating than an unexpected interruption to your work, especially one that causes you to lose what you've been laboring over. This has probably happened to you before; it's an all-too-common scenario. There you are, busily creating a Word document, when the screen freezes. You can't type in any more words, and the mouse won't respond to anything you do, even when you beat it against your desk.

Your application has crashed, and all the changes you made since you last saved the document have vanished.



Now What? We've seen frustrated users simply power off their PCs by pushing the power button on their hard drives and then restart it again a few moments later. While this will eventually help get you back into the program that stopped working, there is a problem with going this route. Shutting off your computer this way means that you didn't exit Windows 98 properly, which might have caused some errors on your hard drive.

When you reboot, Windows will employ ScanDisk to look for errors such as lost file fragments and invalid file names and dates on the hard drive. Though running ScanDisk is fine in and of itself, it's also a bit time consuming. Save yourself some time by employing a simpler way to get your computer out of the "deep freeze."

Use The Keyboard. Unfortunately, a computer sometimes takes a mouse's functionality with it when it freezes. If your mouse won't respond to your commands, you'll need to turn to your keyboard to communicate with your PC. Thankfully, you won't need to tell it much.

Begin by simultaneously pressing and holding down CTRL-ALT-DELETE. This should immediately bring up the Close Program dialog box. If not, don't panic. Sometimes its takes Windows several moments to respond to the CTRL-ALT-DELETE command.

The Close Program dialog box lists all the applications that are currently open on your computer, including the unresponsive one. (Another quick way to tell which programs are open is to glance at your Taskbar, which most likely resides at the bottom of your screen. The Taskbar includes icons for the programs you have open.) Using the arrow keys on your keyboard, select the program that crashed and then press ENTER, which will have the same effect as clicking the End Task button.

That's the simple way to close an unresponsive program because it won't affect any other applications. However, it's possible for more than one program to freeze at the same time, which means you might be better off just restarting your computer entirely.

To safely shut down and automatically restart your computer using keyboard commands, press and hold down CTRL-ALT-DELETE and then, when the Close Program dialog box appears, press and hold down the same three keys again. Your computer will immediately shut down and then reboot.

To exit a frozen application and completely shut off your computer, press CTRL-ALT-DELETE and then click the Shut Down button in the Close Program dialog box. (If your mouse isn't working, use the TAB button to select Shut Down and then press ENTER.) When you see the It's Now Safe To Turn Off Your Computer message, you can press the power button on your hard drive to finish the shutdown process.

Keep in mind that whether you choose to shut down and restart your computer or shut it off completely, you will lose *all* unsaved information in *any* open application, not just the program(s) that stopped working.

Save Often. Unfortunately, application crashes are a fact of computing life. In spite of the annoyance they cause, they really are one of the less troublesome PC problems because they are so easy to fix. Troubleshooting an application crash is free and requires no special software or advanced know-how.

We can't tell you how to avoid freeze-ups altogether, but we can offer these two suggestions for coping with them and, hopefully, making them occur less frequently.

First, save your work often. We can't emphasize that enough. When you let your fingers come up for air as you type, make it a habit to save your document or file. Then, when the inevitable crash does occur, all you'll really lose is a few moments of your time.

Second, keep the number of applications you have open at the same time to a minimum. Yes, it's very convenient to minimize programs and switch between them by clicking their icons on the Taskbar. Remember, however, that opened programs gobble up RAM (random-access memory), and your PC will remain stable and run more efficiently if hordes of applications aren't competing for insufficient memory. LS

by Rachel Derowitsch

What You Need To Know

Benefits
You'll learn to quickly and safely close programs that have crashed or become unresponsive.

Time
Typically less than a minute

Skill Level
Easy

How To . . .

Solve The Blue Screen Of Death

There are few things worse then plugging away at your computer only to have your application freeze up and your screen suddenly turn blue. This happens to almost every computer user, and if you've seen it, you've automatically been admitted to the Blue Screen Of Death club.

The Blue Screen Of Death, which is commonly referred to as the BSOD, is the most obvious and unnerving way your computer can tell you something has gone very wrong. The technical term for the BSOD is the "stop screen" because the error you've encountered is significant enough to cause every process on your computer to stop.

In simple terms, the BSOD occurs when applications within the operating system aren't behaving correctly. This is usually the result of one of the three following problems: access to an illegal instruction has been encountered, invalid data or code has been accessed, or the privilege level of an operation is invalid. When these things occur, the processor returns an exception to the operating system, which in turn is handled as a Fatal Exception error. That blue screen, which is usually covered with hexadecimal error codes, is what results. In most cases, the exception is nonrecoverable, and you must restart or shut down the system.

But the BSOD is not as terrible as it may seem. Once you learn a little about what causes it and how you can solve it, you won't worry quite so much the next time it suddenly rears its ugly head.

What You Need To Know

Benefits
Learn what causes the dreaded Blue Screen Of Death and what you need to look for to fix the problem.

Tools
Internet access

Time
1 to 2 hours

Skill Level
Intermediate

■ **Look & Learn.** The error codes that appear along with the Blue Screen Of Death are not random collections of letters and numbers. Those codes mean something, and they will give you very important clues you can use to uncover the problem.

When you look at the BSOD, you will see it is divided into five sections. Three of these main sections are very important to finding a solution. The top section will contain the error code and parameters and should look like several random number groups. Carefully write down these codes exactly how they appear on-screen.

Next, go to the Microsoft Knowledge Base at the Microsoft Web site (http://www.microsoft.com, click Support, and then click Searchable Knowledge Base). The Knowledge Base contains many articles that explain specific Stop messages and resolutions to these problems. Search the Knowledge Base for the first hexadecimal number exactly as it appeared on your screen. The Knowledge Base will likely be able to return some information that can help you figure out what caused the problem and help you solve it.

The middle section of the BSOD should contain a list of all the **drivers** (programs that allow a hardware peripheral to communicate with the computer) that were running when the crash occurred. Many BSODs are caused by driver problems, so keep documentation of when you installed your drivers and what those drivers are for. This can go a long way toward helping you solve the problem. If you aren't sure and you are still having trouble, you may want to try uninstalling the most recent driver that you installed.

Finally, the bottom section of the BSOD will contain a dump of the memory modules that were on the memory stack at the time of the crash. These can be very important clues to solving your problem as well.

■ **Understanding Stop 0xA.** One of the most common BSOD errors is STOP 0x0000000A. This message, also known as Stop 0xA, indicates that a **kernel** (the main part of an operating system that handles the most basic but most important tasks, such as managing the computer's resources, starting programs, and keeping time; the kernel remains in memory after the operating system loads) mode process attempted to access a portion of memory in an **IRQ** (interrupt request line) that was too high.

IRQs are communications routes within a computer that are reserved for carrying interrupt signals which tell the CPU (central processing unit) to halt its current task and await further instructions. Different computer components, such as modems, keyboards, mice, sound cards, and other devices, each have a special IRQ set aside for them to use. These IRQs are prioritized according to the importance of each device, so the most important interrupt requests are handled first. A low IRQ number means an important device will be able to override other devices. A kernel mode process can only access other processes that have an IRQ lesser than or equal to its own.

The most common cause of this error is a corrupt **pointer** (a variable used by a program to refer to a block of memory) that references

an incorrect location in memory. If the variable has a bad value in it, a STOP 0x0000000A message will occur.

Hardware or software problems can cause the Stop 0xA message. The easiest way to diagnose the problem, therefore, is to recall whether or not you've recently added any new hardware or drivers. If so, go back and remove the hardware and driver. If that doesn't solve the problem, try updating all of your drivers if possible.

If you'd rather determine the exact cause of the Stop 0xA rather than remove anything from your system, you'll have to examine the message more thoroughly. You can determine which process or driver tried to access memory it shouldn't have by looking at the parameters displayed on the BSOD. As an example, Microsoft uses the following Stop message:

STOP 0x0000000A(0xWWWWWWWW, 0xXXXXXXXX, 0xYYYYYYYY, 0xZZZZZZZZ)
IRQL_NOT_LESS_OR_EQUAL
** Address 0xZZZZZZZZ has base at <address>- <driver>

The four parameters inside the parentheses have the following meaning:

- 0xWWWWWWWW: Memory address that was referenced improperly
- 0xXXXXXXXX: IRQ that was required to access the memory
- 0xYYYYYYYY: Type of access: 0=Read, 1=Write
- 0xZZZZZZZZ: Address of the instruction that attempted to reference the memory at 0xWWWWWWWW

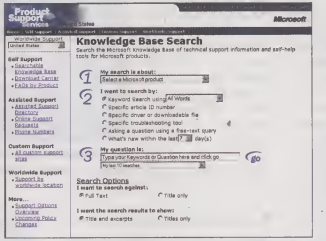
If the last parameter falls within the address range of one of the drivers loaded on your system, you will know which device driver was running when the memory access occurred. This driver is often identified in the third line of the STOP screen: **Address 0xZZZZZZZZ has base at <address>- <driver name>. If <driver name> is a specific driver, search in the Microsoft Knowledge Base on the keyword 0x0000000A and the driver name for suggestions for solving this problem.

Other Common Errors. In all, there are 15 processor errors that can cause a BSOD. You can identify which one you have by looking at the code that immediately follows the words Fatal Exception. According to Microsoft, some of the most common errors include general protection faults, divide faults, and page faults.

General Protection Fault (13 OD). This occurs when anything happens that is not covered by any of the other processor exceptions. The exception indicates that the program has been corrupted in memory.

Divide Fault (00). You'll see this if a program tried to divide a value by zero or if the results of the operation do not fit in the destination operand. For example, the program was expecting a positive number and got a negative number instead.

Page Fault (14 OE). This occurs when you are running low on memory. A page fault allows the operating system to recover small code segments from temporary storage on your hard drive that were put there when memory resources started getting low. This error usually occurs whenever an application goes looking for a piece of itself in RAM (random-access memory) and cannot find it. The operating system will attempt to retrieve the missing page of code from your hard drive. If it is unsuccessful in doing so, you get the BSOD.


Microsoft
Knowledge Base Search
Search the Microsoft Knowledge Base of technical support information and self-help tools for Microsoft products.
Select a Microsoft product
Keyword Search using All Words
Specific article ID number
Specific driver or downloadable file
Specific troubleshooting tool
Asking a question using a free-text query
What's new within the last 7 day(s)
Type your keywords or Question here and click go
Search Options
Full Text
Title only
Title and excerpts
Titles only

Head to Microsoft's Knowledge Base to help crack those BSOD (Blue Screen Of Death) error codes.

0x0000001E KMODE_EXCEPTION_NOT_HANDLED. This is a common error that can be caused by outdated drivers and hardware problems. Usually, the second parameter will point to the driver or function that caused the problem. Always note this address as well as the link date of the driver that contains this address.

0x00000051 REGISTRY_ERROR. In this case, something has gone wrong with the Registry (a database that contains information about user preferences and system configuration in Windows 95, Windows 98, and Windows NT. It could indicate the Registry received an input/output error while attempting to read one of its files as a result of a hardware problem or file system corruption.

0x00000077 KERNEL_STACK_INPAGE_ERROR. A bad memory block in a paging file or a disk controller error causes this error message. If the error is a result of a paging error, AUTOCHK will attempt to find the bad block the next time you boot up your system.

0x0000007B INACCESSIBLE_BOOT_DEVICE. Here, your system is unable to access the boot device. Often, this indicates a disk controller configuration problem or an error in accessing the hard drive. It also may indicate that a virus has infected the boot sector.

0xC000009C and 0xC000016A. Both of these codes indicate a bad memory block on the hard drive.

0xC0000185. This code indicates that two devices are attempting to use the same IRQ, that there has been improper termination of a SCSI (Small Computer System Interface) device, or that there is bad SCSI cabling.

0x0000007F UNEXPECTED_KERNEL_MODE_TRAP. This message may indicate a RAM problem, a BIOS (Basic Input/Output System) problem, or corrupted file system drivers. Make sure your RAM modules are of the same speed and type.

0x00000080 NMI_HARDWARE_FAILURE. When you see this message, a hardware error has occurred. Using nonparity memory in a parity-based system, mixing parity and nonparity memory, or bad RAM modules can cause this problem.

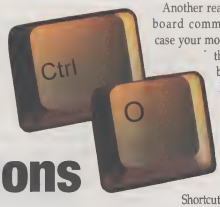
0x0000000A IRQL_NOT_LESS_OR_EQUAL. A bad driver usually causes this error. Contact the manufacturer of the device that is causing the problem or visit its Web site for an updated or correct driver.

Don't Be Afraid. No matter what causes it, the Blue Screen Of Death is scary. However, don't let it shake you up too much because yo ucan solve most BSOD problems. If you can't figure out the problem with Microsoft's Knowledge Base, give Microsoft's technical support a call. After all, they've had plenty of experience in this area. LS

by Justine K. Brown

How To . . .

Create Keyboard Commands To Launch Applications



If there's a drawback to having gigabytes of storage on a hard drive, it's that you can cram so many files, folders, and programs on your computer that hunting down the one you want can be a time-consuming process. Wouldn't it be nice to reach in and grab the one you want without so much effort?

With Desktop shortcuts, you can open programs, files, and folders without employing the Run tool on the Start menu or opening window after window to find the item in the first place. For even greater convenience, you can create a key combination that lets you open the shortcut, which means your Desktop doesn't even have to be visible in order to launch the application.

Create A Shortcut. Creating shortcuts is easy. You can create a shortcut and a shortcut key combination in just a couple of minutes.

First, locate the item you want to create a shortcut for. (If the shortcut already exists, skip to the Create Shortcut Keys section of this article.) You can create a shortcut for anything, including a document and a networked PC, but it's most likely you'll create them for frequently used files, folders, and applications, such as a spreadsheet program or your MY DOCUMENTS folder.

The next step varies depending on where you want to place the shortcut. If you want the shortcut to appear on your Desktop, the logical place, right-click the item. From the pop-up menu, choose Send To and then Desktop. Windows 98 immediately creates a shortcut and adds it to your Desktop. The alternative way to create a shortcut is to right-click the item and choose Create Shortcut. The new shortcut will appear in the folder in which the present item resides. Just click the new shortcut and drag it to the location of your choice.

You can change an assigned keyboard shortcut combination at any time.

Create Shortcut Keys. You also can improve the speed and ease with which you can open a Desktop shortcut. Win98 lets you create keyboard commands that will open item for which you have a shortcut.

Next, you might wonder why you would even need or want this option. The primary reason is when you're knee-deep in work or play in another application, your Desktop (or most of it) probably isn't even visible. Therefore, to access the shortcut, you would need to completely close or at least minimize open windows or click the Show Desktop item on the Taskbar. Granted, those aren't time-consuming tasks, but there is a faster way, especially if you're working in a program, such as Microsoft Word, in which you are mostly using the keyboard instead of the mouse.

Another reason to have the keyboard command available is in case your mouse stops working. In this rare instance, keyboard commands are lifesavers.

To create a shortcut key combination, right-click the shortcut and select Properties from the pop-up menu. On the Shortcut tab, find the Shortcut Key field. This is where you will type in the key combination you will assign to the shortcut.

Before you deliberate too long on what the key combination should be, be aware of the following parameters. By default, Win98 assigns CTRL-ALT as the beginning of all shortcut key combinations. Furthermore, the following keys are not available for use: ESC, ENTER, TAB, PRINT SCREEN, Spacebar, and BACKSPACE. Finally, keep it simple: As long as the combination doesn't conflict with a combination already assigned to another shortcut, limit yourself to one key.

Now, it's not necessary to first type CTRL-ALT to create your key combination, though you will need to press those keys when you use the keyboard command later. Simply click in the Shortcut Key field, pick the key you want to use with CTRL-ALT, and press it. For example, we wanted the combination to our WinZip shortcut to be CTRL-ALT-Z so we just clicked in the Shortcut Key box and typed z. (It's not necessary to hold down the SHIFT key.)

Before you click Apply to make your shortcut key combination official, you need to make one more decision. In the Run field on the Shortcut tab, click the down arrow and choose either Normal, Minimized, or Maximized, which indicates the size of the window in which the application will run once you open it using your keyboard shortcut.

At any point, you may change the shortcut key combination by typing in a new letter or number in the Shortcut Key box. LS

by Rachel Derowitsch

What You Need To Know

Benefits
You'll learn how to start a program using a keyboard shortcut.

Time
About 3 minutes

Skill Level
Easy

How To . . .

Fix Desktop Shortcuts

If you've ever taken a shortcut when driving and encountered an obstacle such as road construction, a washed-out bridge, or misleading road signs, you know the feeling of attempting to use a Desktop shortcut that won't work. You end up wasting time and wishing you would have taken the longer route.

Unlike the problems you run into on the road, you have the power to fix a missing or nonfunctioning shortcut on your PC. The following possible solutions will help you solve most of the problems you encounter.

If you do find the missing shortcut, just right-click it and select the Restore command from the pop-up menu. Another method for restoring a shortcut is to click it and drag it back to the Desktop.

■ **Check The Trash.** Every now and then, you may mistakenly delete something from your computer. When this happens, you will probably realize your mistake eventually and correct it. If you share your computer with other users, however, you may not be aware of their file-dumping activities.

Therefore, the first and most obvious place to look for a missing Desktop shortcut is the Recycle Bin. Open the trash from your Desktop by double-clicking the Recycle Bin icon and look for the shortcut by name, original location, date deleted, or type. The last two options will most likely be the fastest way to hunt because you can scan the Type column for the word "Shortcut" or simply view the most recent deletions.

It's also possible the shortcut was sent somewhere else, such as a diskette or disc, or even permanently deleted. Instead of expending the effort to find it, it is much faster to create a new shortcut, provided the file, folder, program, or other item you are creating the shortcut to is intact. For a quick tutorial on how to create a shortcut, see the previous article in this issue.

■ **A Moving Target.** A visible but nonworking Desktop shortcut presents a greater challenge. To pop open the hood for a look-see, right-click the shortcut and select the Properties command.

On the Shortcut tab, look at the Target field. This gives the location of the item the shortcut is pointing to. For example, the shortcut to Microsoft Publisher on our PC says that application is at C:\PROGRAM FILES\MICROSOFT OFFICE\OFFICE\Mspub.exe. Obviously, the shortcut won't work if you or someone else has moved the item because Win98 won't automatically update the new location on this tab.

To see if the location is correct, click the Find Target button on the Shortcut tab. The button opens the window in which the item is supposed to be. In our example, it would open the OFFICE folder. If you can't find the targeted item, click the Start button, Find, and then Files Or Folders. Type in the name of the item, select the right part of your system to search (in the Look In field), and press ENTER. If the Find tool tracks down the file or program you are searching for, type the new file path into the Target field on the Shortcut tab and click Apply.

Another option is to move the targeted item back to its original location. Either way, once the item is in the place the Target field says it should be, you'll need to click the Find Target button once more to validate the file path listed in the Target field.

The worst-case scenario is the application for which you made the shortcut was uninstalled or has some damaged files. If all else fails, properly reinstall the application from its original source and then verify its location matches the Target field on the Shortcut tab.

■ **Other Considerations.** A nonworking shortcut is in all likelihood due to a misplaced application or file, as we just described. But here are some other things to try when you can't get a shortcut to work.

- On the Shortcut tab, look at the Start In field. Indicate here which folder Win98 should look in for other files, if any, the targeted item uses when launched, or for the item itself.
- In the Run field on the Shortcut tab, check to see how the targeted item opens when the shortcut is used: Normal Window, Maximized, or Minimized. You may not notice an application or item when it opens in a minimized view, one in which the file or program merely pops up on the Taskbar.
- If clicking what you thought was the shortcut to, say, the folder containing your tax returns opens another folder or program entirely, it's possible you or someone else renamed the shortcut or that a new icon was assigned to it. To rename the shortcut, right-click it and select Rename. To change its icon, click the Change Icon button and select from the listed choices.

■ **Preventative Medicine.** Once you restore your shortcut, take a precautionary measure. Right-click your shortcut, select Properties, and click the General tab. Next, click the Read-Only box and click OK. Now, no one can accidentally modify or delete your shortcut. LS

by Rachel Derowitsch

What You Need To Know

Benefits
Learn how to restore missing or nonworking shortcuts to your frequently used files, folders, and applications.

Time
Less than 3 minutes, unless you need to reinstall an application

Skill Level
Easy

How To . . .

Fix Files That Won't Print

When getting a hard copy is the hardest part of producing a document, frustration can run high. To start the process of identifying why your files won't print, you should first decide whether the printer's to blame by determining whether your file is reaching the printer.

Most laser printers have a status light that blinks as the printer receives data. Because a laser printer doesn't eject paper until it receives all the data, use this status light to determine that data is flowing to the printer. Inkjet printers produce documents line-by-line, so they pull paper through and start printing right away. If the laser printer's light blinks for several minutes, but no document emerges, check whether the printer is displaying an error message or an error code. Many low-cost laser printers use blinking lights to display errors, so have your manual handy to decipher the error message. If the status light never blinks or if a page never loads into your inkjet printer, don't blame the printer; the fault lies elsewhere.

The trouble may rest with the print spooling process. Open the Windows 98 print spooler by clicking the printer icon that appears in the Toolbar when you print a file. Make sure the printer listed at the top of the spooler window is connected to your system or is reachable through a network. If you accidentally send your file to a printer that's not connected to your system, it may sit in "spooler limbo" forever.

What You Need To Know

Benefits
Reliable printing with less paper waste and less use of consumables

Time
About 5 minutes per task listed

Skill Level
Easy to Intermediate

■ **Big Document Problems.** If your document contains many large graphics or photos, the memory buffers on some inexpensive laser printers may be too small to hold the entire page. In this case, you will get a Memory Overflow or Print Overrun error.

To fix this problem, reduce your printer's graphics resolution by clicking Windows' Start button and selecting Settings and Printers. Click your printer's name and select Properties from the menu at the top of the Printers window. Click the Graphics tab and select the next lower resolution for graphics. (Text will print at your printer's maximum resolution.) Click OK when you're done.

If you must consistently reduce your resolution to print pages, upgrade your laser printer's memory. Add at least 4MB (megabytes) or more and be sure to update the printer properties to reflect the new memory amount after you install it.

■ **Running Out Of Room?** The Win98 print spooler uses your TEMP folder, which is normally located in C:\WINDOWS\TEMP, to store print jobs before they travel to the printer. If your C: drive runs short on free space, your print spooler might be unable to save the print job to disk. Normally, temporary files (with the .TMP extension) in the TEMP folder are deleted after you print a file or exit a program, but if your computer crashes, the "temporary" files in the TEMP folder will continue to take up space. You can delete files in your TEMP folder with dates older than the current date. If your C: drive has less than 200MB of space remaining and you have another hard drive connected to your system, you can add the statements:

```
SET TMP=D:\TEMP
SET TEMP=D:\TEMP
```

to your Autoexec.bat file to redirect print jobs and other temporary files away from the C: drive. Be sure to create the TEMP folder on your D: drive (provided that's the letter of your auxiliary hard drive) and reboot the computer to activate the new SET statements.

■ **Printers Speaking In Tongues.** If your printer produces pages covered with unreadable gibberish instead of your document, check whether you're using the correct port for your printer. If you have an inkjet printer connected to LPT1 and a laser printer connected to the network, for example, you must match printer and port in the Details tab of the printer properties sheet. If you accidentally set your laser printer to also use LPT1, which is connected to the inkjet printer in our example, the inkjet printer will print gibberish because it uses a different printer language than the laser printer.

You should also try printing another document. If that works, the first document you tried is damaged. To try fixing it, retrieve the document into your application, copy the content to the Windows Clipboard, and paste it into a blank document you save under a different name. Try to print the new document.

If you are trying to print a PowerPoint or similar type of presentation that mixes text and graphics, some laser printers will misinterpret the layers of text and graphics, causing the background to bleed through to the foreground. You can fix this type of problem by opening the Graphics tab of the printer's Properties dialog box. Specify Use Raster Graphics for the print type.

If the printout still looks distorted, try the Win98 Print troubleshooter. Open the Help menu, select Troubleshooters from the list of topics, and select Print. Answer the questions presented to find more solutions. LS

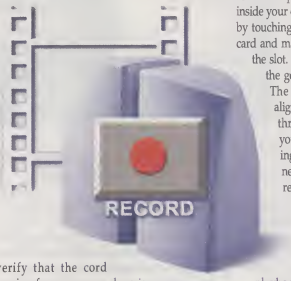
by Mark Edward Soper

How To . . .

Troubleshoot Audio & Video Recording Problems

Whether you're recording a video clip to e-mail to a friend or simply creating your own sound effects for Windows events, recording audio and video on your computer provides both entertainment and usefulness. Unfortunately, as with any other computer-related task, problems may arise.

The first step in problem solving is prevention. One of the easiest and most effective tasks you can do to prepare your system is defragmenting your hard drive. A fragmented drive contains pieces of files spread over different physical locations. This fragmentation makes the job of streaming data to and from the drive very difficult. Use one of the cleanup programs that come with your operating system, such as Disk Defragmenter, before making any recordings.



■ **Audio.** If you hear no sound at all when recording or playing back a recorded sound, there are several things you might try. First, verify that the cord coming from your speakers is tightly plugged into the correct jack on the sound card at the back of your computer.

Next, check to see if your volume is up (although not all the way up or your speakers may hum). Double-click the volume icon on the right end of the Taskbar or choose Start, Programs, Accessories, Entertainment, and Volume Control to open the Volume Control window. Move the volume slider up or deselect mute.

Plug a set of headphones into the jack on your sound card. If this enables you to hear sound, you know that the problem is with your speakers.

If you have recently installed a new piece of hardware or a new expansion card, an **IRQ (interrupt request line**, communications route between the device and the CPU (central processing unit) or a **DMA (direct memory access**, a means of transferring data) may cause a conflict that interferes with your sound card.

Begin with trying the Hardware Conflict Troubleshooter in Windows 98. Access it by choosing Help from the Start menu. Under the Contents tab, choose Troubleshooting, Windows 98 Troubleshooters, and then Hardware Conflict. Follow the instructions as Win98 walks you through figuring out a possible conflict. Another solution may be to simply remove the new piece of hardware and restart your computer. If this solves your sound problem, you will need to contact the manufacturer of the new hardware for suggestions on fixing the conflict.

Finally, it may be that your sound card is not inserted properly. Perhaps you knocked it loose while working on something else inside the computer, or maybe you had to move it and did not reinsert it properly. Before handling anything inside your computer, be sure to ground yourself by touching something metal. Find your sound card and make sure that it is fully inserted into the slot. You should see only the very top of the gold connectors along the card's tab. The back of the sound card must be aligned against the open slot and visible through the back of the computer. If you remove the sound card, use a rocking motion to reinsert it. Place one corner of it in the slot and then rock the remainder of it into place.

Scratchy, skipping sound. We already noted that IRQ or DMA conflicts might cause a complete loss of sound. Such conflicts may also result in scratchy sounding playback. The DMA channel or IRQ line that your sound card is attempting to use may have other devices trying to use it too. As mentioned above, the Win98 Troubleshooter provides a good starting point.

Another option is to check your computer's Device Manager for any listed conflicts. Choose Settings and Control Panel from the Start menu. Then, double-click the System icon. Within the System Properties window, go to the Device Manager tab, and look for your sound card (it might be under the Sound, Video, And Game Controllers icon). Highlight the driver and click the Properties button. When the Properties window opens, choose the Resources tab. Here, you will see the DMA and IRQ settings, and if conflicts exist, they will be listed at the bottom of the window.

Poor sound quality and distortion. The major culprit of distorted sound may be certain settings that have been assigned within Win98. These settings determine the quality of the sound you record. Check the settings by opening the Start menu and choosing Settings, Control Panel, and then the Multimedia icon.

What You Need To Know

Benefits
Successful recording of audio and video

Tools
Headphones (to help you determine the source of the problem)

Time
5 to 30 minutes, depending on what you are trying to fix

Skill Level
Intermediate

Select the Audio tab on the Multimedia Properties dialog box. Here, you can specify the quality for both playbacks and recordings. Click the Advanced Properties button to make hardware acceleration and sample rate conversion level adjustments. Low settings may result in sound distortion. On the other hand, higher settings may strain your CPU and consume valuable system resources.

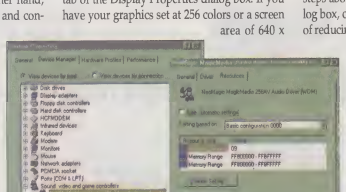
If you use Win98's Sound Recorder, your might need to adjust the sound quality settings within this utility, too. Audio CDs use a 44.1KHz (kilohertz) sampling rate and 16-bit samples per stereo channel. In contrast, Sound Recorder's default sampling rate is typically that of "radio quality" with a 22KHz sampling rate and 8-bit samples (which is only half of that for CD audio) played in mono instead of stereo. Within Sound Recorder, choose Properties from the File menu. Click the Convert Now button, and in the Sound Selection window, choose CD Quality from the drop-down menu. While increasing the sample size and rate settings may improve your sound quality, it will also require more system resources and hard drive space.

Once again, DMA or IRQ conflicts might be the cause of distorted sound or static. Follow the instructions above for using Device Manager or the Win98 Troubleshooter to locate possible conflicts.

Naturally, poor speakers can also cause distortion. Plug a set of headphones into your sound card's output jack to help determine whether the problem is with your speakers. If your speakers are amplified, make sure that they are plugged into the line-out jack, not the speaker jack, on your sound card (the speaker-jack signal is amplified and could be overdriving your speakers' amplification circuits).

Finally, you might be able to improve your playback sound quality by specifying the type of speakers you are using. In Win98, click Start, Settings, and then Control Panel. Double-click the Multimedia icon. Select the Audio tab of the Multimedia Properties window. Click the Advanced Properties button in the Playback section of the window to specify your speakers. Find and select your speakers from the drop-down menu on the Speaker tab and click OK.

Video. If you think your newly recorded piece of video exhibits unduly low resolution or washed-out coloring, the problem may stem from your graphics settings rather than your amateur videography. To increase your computer's resolution settings and the number of colors it can handle, choose Start, Settings, Control Panel, and Display. Select the Settings tab of the Display Properties dialog box. If you have your graphics set at 256 colors or a screen area of 640 x 480 pixels, you should notice significant gains after increasing the settings and restarting your computer. (You also might be able to make some adjustments within your video recording or editing software.)



Use the Device Manager to track down possible IRQ (interrupt request line) or DMA (direct memory access) conflicts between various pieces of hardware.

If you intend to only use your video locally on your own computer or if you need it for the sole purpose of capturing still images from it, go ahead and boost its color and resolution settings. See the next tip to find out under which circumstances lower resolutions may be preferable.

Too slow, too cumbersome. For applications in which you plan to use your video online or share it via e-mail, you may find yourself considering the trade-off between quality and convenience. Not only will a smaller piece of video travel faster along the information superhighway, it will also save system resources and minimize file size. Think about it: While a file, 800 x 600 pixels in size, may look nice, a 320 x 240 resolution renders a video clip far easier to manipulate. Furthermore, setting your graphics to 24-bit results in an astounding array of over 16 million colors, but the more moderate 16-bit setting offers a satisfactory recording with a significantly smaller file size. When it's time to sacrifice quality for convenience, follow the steps above to access the Display Properties dialog box, or consult your software for other ways of reducing resolution and colors.

If your video recording problems stem from improper resolution and color settings, you'll need to access the Display Properties dialog box where you can increase or decrease them.

Jerky video. High resolution may also cause video to play back in a jerky, choppy manner. The reason is that the higher the resolution, the fewer frames per second the camera can record and display smoothly. Remedy the problem by reducing the resolution. A slow processor can also cause choppy playback; it may be that you simply need to upgrade your system.

Dark video. You may experience dark video if you made your recording in a room with no windows or poor lighting. Think about your lighting situation before pressing the Record button because some cameras may or may not automatically adjust for dim light. Check your software for other settings that can help you control light and dark recordings.

Poor audio. If your video playback lacks audio quality, check the volume settings to ensure your PC's audio settings are at the optimum level. Choose Start, Settings, Control Panel, and then the Multimedia icon. On the Audio tab, click the Advanced Properties button under Playback and make sure the settings under the Speakers and Performance tabs match your system. Again, remember that as with resolution and colors, the higher the sound quality, the larger the file will be. Many software packages let you choose between an OK audio recording setting and a CD-quality setting.

If these suggestions fail to solve your audio and video recording dilemmas, check with the manufacturer of your input device, sound card, or video card for further advice. LS

by Hannah Henry

How To . . .

Restore System Fonts

You start up your computer and gasp in disbelief: All the checkboxes on your windows have turned into musical notes; all arrows have changed into numbers; and the letters beneath your icons are a garbled mess that only vaguely resembles a human language.

No, your PC hasn't become possessed, nor is the damage likely to be irreversible. What is most likely the root of your problem is a missing or damaged system font.

When Windows is installed on a PC, about 55 system fonts are also installed. Among these are key fonts, such as Marlett, which forms the outlines of the windows that Windows uses. If you inadvertently delete any of these system fonts during a bout of PC housecleaning, or if one of the fonts becomes corrupted or loses its system attributes, you may encounter chaos on your Desktop.

The solution is simple: reinstall your system fonts.

Reinstalling Fonts. To reinstall system fonts, first insert your Windows installation CD in your drive. Next, go to your PC's Start menu, choose Programs, Accessories, and then System Tools. Drag your mouse down the list of tools until you see System Information. When the System Information window opens, go to the Tools menu at the top and select System File Checker.

The Windows System File Checker is a handy utility that will scan your system to see what, if anything, has changed from the original installation. If a font is missing or damaged, the System File Checker will replace it with a fresh version from the installation CD. If you know which specific file needs fixing, you can skip the scan and simply have the System File Checker replace this file.

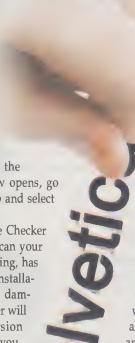
To use the System File Checker to scan your drive, click the Settings tab in the main System File Checker window. On the bottom of the Settings window will be two boxes: Check for damaged files and Check for deleted files. Put check marks in these boxes, click OK, and then close this window.

Next, return to the System File Checker main menu. Select the first option (Scan for altered files) and click Start. The utility will then let you know if it finds any files it thinks should be replaced; you should accept the changes it proposes.

If you know the precise file name for the missing system font (such as marlett.ttf, for instance), you can select the second option on the System File Checker window, Extract One File From Installation Disk. If you don't know the file's name but do know where it is stored on the Windows installation CD, you can choose the Browse option and navigate your way through the CD until you find it. The file then will be restored to your system folder.

If this doesn't restore your desktop to its proper appearance, your font files may have lost their system attribute. Right-click My Computer and choose Explore from the context menu. Scroll through the list of folders until you see Windows. Open this and look for the folder labeled Fonts. Right-click this folder and select Properties. See if the box marked System is checked in the Attributes field. The box might be grayed-out, but a check mark should still be visible. If it is not, place one there and reboot.

In the future, if you want to trim the fat from your PC by cutting out extra fonts you've acquired, avoid deleting any system fonts. How do you know which fonts are system fonts? It's not always easy, but in general avoid deleting anything that begins with MS. You can also check for the creation dates for fonts: Windows 98 first edition fonts carry a 5/11/98 date, while those from the second edition should say 4/23/99.



Don't Delete These. If you're a Win98 user, save yourself some trouble and do not delete any of the following; they are system fonts:

Arial (including Black, Bold, Italic, and Bold Italic); Book Antiqua; Calisto MT; Copperplate Gothic Bold;

Copperplate Gothic Light; Courier (New, New Bold, New Bold Italic, New Italic and Courier 10, 12, 15); MS-DOS CP 437; Century (Gothic, Gothic Bold, Gothic Bold Italic, Gothic Italic); Impact;

Lucinda (Handwriting Italic, Sans Italic, Sans Unicode, Console); Marlett; Matisse ITC; Modern; News Gothic (MT, MT Bold, MT Italic); OCR A Extended; MS Serif 8, 10, 12, 14, 18, 24; MS Sans Serif 8, 10, 12, 14, 18, 24; Symbol; Small Fonts; Tempus Sans ITT,

Times New Roman (including Bold, Bold Italic, Italic); Verdana (including Bold, Italic, Bold Italic); Fixedsys; Terminal; Webdings; Westminster; Wingdings. LS

by Lorna Collier

What You Need To Know

Benefits
Missing system fonts can cripple a Windows system, leaving it unable to display even basic window information. Restoring these fonts gets your PC up and running and looking the way it should.

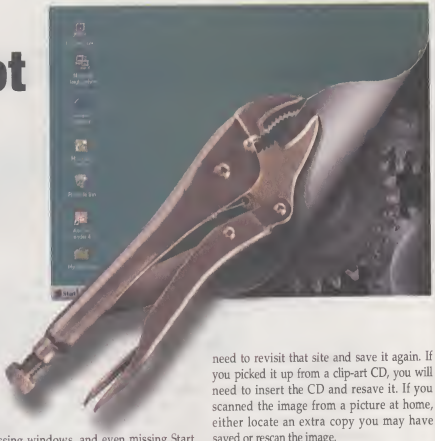
Tools
Windows 98 installation CD

Time
About 10 minutes

Skill Level
Intermediate

How To . . .

Troubleshoot Desktop Problems



You're busily working away at your computer, using several programs at once, with multiple windows open. You're dragging and minimizing and maximizing and mousing all over your too-small 15 inches of monitor space.

Suddenly, you realize that one of your windows is missing. It shows up on the Taskbar, where you minimized it, but when you click it to maximize, the window doesn't appear anywhere. You close all your other windows, but it is still missing.

Don't worry, your work isn't lost. Your window is actually lurking just out of sight, somewhere off the edge of your Desktop. In fact, if you look very, very closely at the edges of your monitor screen, you will probably find a tiny corner of your window still visible, just waiting for you to grab it with your mouse and drag it back into full view.

What You Need To Know

Benefits
Finding or customizing Desktop items saves time and restores productivity and peace of mind.

Tools
You may need a Windows 98 CD

Time
No more than 5 minutes

Skill Level
Easy

Missing windows, and even missing Start buttons and Taskbars, are a common Desktop problem that you may expect to encounter on your computer, along with icons that change in ways you didn't intend and background pictures that vanish without warning. Though these types of glitches are frustrating and sometimes puzzling, they are usually easy to solve.

Here's a guide to some of the most typical Desktop mishaps, along with instructions on how to fix them.

■ Desktop Wallpaper Is Missing. Occasionally, the image files that your computer uses to create a background become corrupted and cannot be displayed properly. If this has happened to you, right-click the Desktop and choose Properties. The Display Properties window will open. Click the Background tab and scroll though the list of patterns or wallpapers to see whether the image you were using is still there. Or, if your image file is located elsewhere on your hard drive, click Browse and scroll through your drive until you locate the file. Click OK to reset your background image.

If this does not work, you will need to reinstall your image file by reloading or recreating it on your hard drive. If you grabbed your image file off a Web site, for example, you will need to revisit that site and save it again. If you picked it up from a clip-art CD, you will need to insert the CD and resave it. If you scanned the image from a picture at home, either locate an extra copy you may have saved or rescan the image.

Sometimes the problem is not with the image file itself but with your computer's color settings. If your background image looks very distorted, check to see if your color settings may have been inadvertently changed. Go to Start, Settings, Control Panel. Choose Display and click the Settings tab. Go to the Color setting and click the arrow next to it. Select High Color (16 bit) or True Color (24 bit) and click Apply to see if either of these makes a difference in the appearance of your image.

■ Windows Background Won't Display In Color. When this occurs, it's usually because Windows' Accessibility Options have become activated.

To fix this, click Start, Settings, Control Panel. Next, choose Add/Remove Programs, then Windows Setup. From here, locate the box that says Accessibility Options. There probably will be a check mark there. Click the box to remove the check mark, click Apply, and reboot your computer.

■ Can't Reposition Icons On The Desktop. Place your pointer anywhere on your Desktop background and right-click. A menu will appear. Highlight the selection that says Arrange Icons. You will then see an option,

Auto-arrange, which probably is checked. Click this option to remove the check mark.

From now on, your icons should be free to be rearranged.

■ **Small Or Large Icons.** Sometimes your icon settings become corrupted, causing your icons to appear either larger or smaller than you want them to be.

To restore icons to their original sizes, click Start, Settings, Control Panel and choose Display. Next, click the Settings tab and click on the slide bar labeled Screen Area. Drag the bar from right to left to make your resolution size larger. The higher the resolution you choose, the smaller the icons will appear to be. Click Apply to accept the changes.

Another way to fix this is to click the Effects tab under Display. There, you can choose whether or not you wish to use large icons. Again, click Apply to accept your changes.

■ **Missing Start Menu.** It is possible to drag the Start menu and Taskbar so far off-screen that it can seem to have disappeared. To get the Start menu and Taskbar back again, you can press the Windows key next to the Spacebar, or you can press CTRL-ESC. Another method is to try to locate it along the edges of your screen and, if your cursor changes into a two-headed arrow, pull it back out where you can see it again.

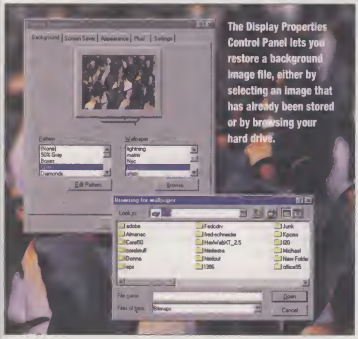
The Start menu, by the way, can be set to Auto Hide, freeing up more Desktop space for your other windows. It will appear whenever you drag your mouse over the section of the window in which it normally resides, but otherwise will disappear. In order to invoke the Auto Hide feature of the Start menu, right-click a bare area of the Taskbar and choose Properties, then select Auto Hide.

■ **The Taskbar.** The Windows Taskbar is on the bottom of most screens, but it can easily be dragged to the top or sides of your display. (You do this by clicking a blank area of the Taskbar and dragging it over to the place you want the Taskbar to reside.) If you accidentally drag it someplace you don't want it to be, simply drag it back.

Placing your mouse along the top edge of the Taskbar until the cursor turns into a two-headed arrow and then lifting and dragging it up will enlarge it. If you don't like this look, you can collapse the bar.

If you right-click an empty space in your Windows Taskbar, you will access the Taskbar Properties menu, which lets you choose whether the Taskbar should always be visible or set to Auto Hide, among other options.

■ **Missing Windows.** As with the Task-bar, windows can sometimes be dragged off-screen, appearing to vanish. If you fish along the edges of your screen and locate a bit of the window's title bar, you can hold the mouse button down and drag the window back into full view. If, on the other hand, the title bar is completely off the screen, you can click any part of the window that does show and press ALT-Spacebar. Select Move from the window that appears and then press your arrow keys until the window's border becomes visible; next, press ENTER.



The Display Properties Control Panel lets you restore a background image file, either by selecting an image that has already been stored or by browsing your hard drive.

You can also have Windows display all open, maximized windows at a glance by choosing the Cascade or Tile Windows options. (Right-click your Desktop and select one of these options from the context menu.) However, if the missing window is one that you have minimized, this trick won't work.

■ **The Channel Bar.** Microsoft designed Windows 98 so that its Channel bar, with links to top Internet interest areas, would automatically run when you start up your PC. If you don't like the bar, you can click the X at the upper right, and it will close down. You also should get a window asking you whether you want the Channel bar to be displayed the next time you start your computer. Simply choose No, and you won't have to see it again.

However, if you change your mind, you can restore the Channel bar to automatic startup by first choosing Settings from the Start menu, then going to the Control Panel and selecting Internet. Click the Advanced tab and then place a check in the Show Channel Bar At Start-up box. Click OK, close the Control Panel, and reboot. The Channel bar should be back on your Desktop once again.

■ **Desktop Image.** If you press the PRINT SCREEN key and nothing happens, you may think there's a problem. Actually, your computer probably is capturing the image of your screen that you wish to print. However, you have to take a couple of steps before printing, because Windows places the image on the Clipboard instead of sending it to your printer.

After pressing your PRINT SCREEN key, open your Windows Paint program, which is located within the Accessories area of your Programs menu. Then press CTRL-V. The image of your screen should now appear within a window in your Paint program. You can crop this image or alter it however you choose. Choose Print from the File menu in the Paint program, and your screen capture will appear on paper. LS

by Lorna Collier

How To . . .

Troubleshoot Windows Startup Problems

Among the problems that occasionally plague Windows 98 users, startup difficulties are perhaps the most frustrating. Win98 provides a plethora of troubleshooting utilities, all of which work from within the operating system. These utilities make it fairly simple to diagnose the system conflicts that cause startup problems, but if you can't start Windows, you can't access them.

Fortunately, Windows provides an option called **Safe mode**, which enables Win98 to start with only a bare-bones system in operation (VGA [Video Graphics Array] monitor, no network, Microsoft mouse driver, and the minimum device drivers). When you start in Safe mode, you won't have access to your CD-ROM drive, printer, or other devices, which can be a pain if you have to reinstall drivers or want to print out help files, but you will have access to those all-important troubleshooting utilities.

We'll provide an overview of the troubleshooting routines used to diagnose startup problems from Safe mode. Should you find that you can't start Win98 in Safe mode, don't despair. At the end of the article, we'll offer a roundup of the troubles that prevent even Safe mode startup, together with the solutions that can cure your startup blues.

Pinpoint The Problem. Before you begin troubleshooting, be certain that what you have is truly a startup failure and not merely a system that is slow to load. You also should make some basic estimates about why you are having problems in the first place.

When you start Win98 during normal operation, a few minutes can elapse between the time the initial system tests are completed and the Windows Desktop appears. Various operations are taking place during this time and you can generally tell the system is processing information, even if the sign is limited to a moving blue bar at the bottom of the screen.

If the bar stops moving, the Windows logo appears and remains on the screen for more than three minutes, an error message appears, or if the notorious Blue Screen Of Death (a blank blue screen with a Fatal Exception error message) appears, Win98 has failed to start normally, and you'll have to do some troubleshooting to restore your system to normal operation.

Nearly all problems that occur in Win98, including startup failures, are caused by one of four obstacles: conflicting devices or device drivers (programs that allows a hardware peripheral to communicate with a computer); conflicting or outdated software; damage to system files, including the Windows Registry; and hardware failures.

If you can determine into which category your trouble falls, you may be able to avoid, or at least minimize, the tedious task of system troubleshooting. To begin this process, you should ask yourself two questions. The first is, "Exactly what happened when Win98 did not start properly?"

For example, if the system froze when the Windows logo screen appeared, but no error messages were displayed, the problem may relate to a conflict between the logo screen and another operation. (If this is your problem, jump straight to The Final Countdown section of this article.)

If you are receiving an error message, make sure you write it down because you can find clues to the source of the problem in the message. One of the most common messages references a file with a .VXD extension, which means a **VxD (virtual device driver**; virtual device drivers act as a simulation buffer between applications and hardware; the drivers sort out and ensure the correct application gets the information) is causing the difficulties. (If you don't remember what happened, restart your computer by pressing CTRL-ALT-DELETE, but write down the message sequence as it occurs.)

The second question you need to ask is, "What is different about my system between now and the last time it ran normally?" There are four common changes that can seriously affect system performance; we explain what those are below.

What You Need To Know

Benefits
Resolve problems and eliminate error messages that prevent Windows 98 from starting up properly, as well as protect the integrity of your system and data files.

Tools
Internet access

Time
15 minutes to 3 hours

Skill Level
Intermediate

Even the best-intentioned individual can accidentally make changes that cause system problems.

Adding new hardware devices. If you add new equipment to your system that is not compatible with the existing configuration, you probably have a driver conflict. Disconnect the device and see if you can restart the system normally. If so, contact the manufacturer for an updated driver and don't use the device until you install the updated information. If a new driver does not solve the problem, if none is available, or if disconnecting the device does not restore the system, keep reading.

Installing new software. Installing new software can cause problems because it can reinstall older versions of utilities that have already been updated by, and are required to run, newer drivers. In addition, diagnostic programs, such as antivirus software, can run automatic operations that prevent the system from starting properly.

Check with the manufacturer regarding updating the software to the newest versions of Windows, and ask if the installation may have overwritten any peripheral programs. Start the computer in Safe mode (see the instructions in the Get Out Of Trouble section). If the software in question is an antivirus package, open the program, review the preferences, and disable any automatic checking operations that occur at startup.

For other types of software, you may want to uninstall the program and see if it solves the problem. If so, you won't be able to use the program until you obtain the appropriate system updates. If these measures do not restore the system, you'll have to keep troubleshooting.

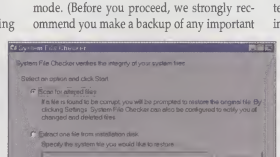
Allowing someone else to use your computer prior to the most recent restart. Even the best-intentioned individual can accidentally make changes that cause system problems. Ask the person if anything unusual occurred during the session, or if he or she made any alterations. If the answer is yes, you may have to replace or repair corrupt or damaged files, possibly including the Windows Registry. Proceed with the troubleshooting routines offered under the Check Your System Files section, below.

Being hit by lightning or power surges, which may have caused electrical damage or shorted out your equipment. If abnormal electrical activity has occurred in your area, it may be the source of your problems, and you should brace yourself for the possibility that you may have to replace some of your hardware. Use the troubleshooting routines that appear in the Test Your Hardware section.

Get Out Of Trouble.

Now that you know what can cause a Win98 startup problem and have narrowed down its source, it's time to find a solution. If none of the scenarios described in the preceding section applies to you, you should follow these troubleshooting routines in the order we give them.

As previously mentioned, the preferred method for troubleshooting is to work in Safe mode. (Before you proceed, we strongly recommend you make a backup of any important files that reside on your computer.) Restart the computer, but this time hold down the F8 or CTRL key. When the computer starts beeping, release the key and wait for the Win98 startup menu to appear (some computers may not beep; if not, press the key until the menu appears).


System File Checker
System File Checker verifies the integrity of your system files.
Select an option and click Start.
Scan for altered files
Extract one file from installation disk
Start
Close
Settings

The System File Checker in Win98 determines whether any Windows files are corrupt or missing and then prompts you to replace them.

Now, choose Safe mode from the menu. Windows will take several minutes to start, and when the Desktop appears, you will notice that words and icons look jagged, and the words Safe Mode appear in each corner.

If you have been receiving an error message during startup, and it doesn't occur during startup in Safe mode, the source of your troubles is probably a corrupt or conflicting driver or program. If you restart in Safe mode and the error message does occur, or if Win98 will not start in Safe mode, jump immediately to The Final Countdown section, below.

(*NOTE: Many of the problems that afflict Win98 during startup are similar to those that occur during shutdown. As a result, if a troubleshooting routine is used in both operations, we will refer you to the "Troubleshoot Windows Shutdown Problems" article in this issue rather than duplicate it here.*)

Check startup routines. With Win98 in Safe mode, the first step is to check your system's startup routines, which involves checking both run commands (by performing a clean boot) and device drivers. These processes are covered completely in the Looking For Trouble section of "Troubleshoot Windows Shutdown Problems."

Check your system files. If the problem is not resolved, there may be a problem with the system files. You can run the Windows System File Checker to evaluate the integrity of these files. Click the Start button, select Programs, Accessories, System Tools, and then System Information. The System File Checker is located under the Tools menu in the Microsoft System Information window.

If the System File Checker finds problems, it will prompt you to restore the corrupted or missing files. Allow Win98 to perform these actions and then attempt to restart the computer in normal mode. If none of these suggestions allows Win98 to start normally, you are probably dealing with either a hardware failure or a corruption of critical Win98 core files. The next section will provide information about installing a clean version of Win98 to perform final testing.

Test Your Hardware.

If you suspect your computer may have been the victim of a lightning strike or power surge (or if none of the previously listed troubleshooting routines has helped), you should install Windows into a new folder and then install your hardware devices, one by one, until the problem recurs.

If the system refuses to start normally immediately after a clean install, you may have problems with the central processing

hardware in your computer, and you should contact the manufacturer or have your hardware checked by a specialist. If the startup failure reoccurs immediately after you add a specific piece of hardware, that device is the source of your troubles.

If Windows starts normally after a clean install, the problem lies with virtual drivers or other core Win98 system files, including the Registry. In this case, it is simplest to abandon your old Win98 installation and begin with a fresh one. You can work with the clean installation in the new folder if you want, but you will be required to reinstall all programs and devices. Another option that may work is to reinstall Win98 over your existing installation.

For specific instructions on installing Win98 into a clean folder, refer to the Microsoft Knowledge Base. Go to http://search.support.microsoft.com, select Searchable Knowledge Base, and search for article Q193902.

The Final Countdown. If Win98 does not start in Safe mode, one of several problems may be the culprit.

Logo conflicts. First, there may be a conflict between the Win98 logo screen and another system component (usually antivirus software or a video card driver). This will be the case if Win98 startup is hanging when the screen first appears. Disable the logo screen and see if this solves the problem (you can leave it disabled permanently). (*NOTE: You must do this procedure very carefully so you don't disturb existing system settings.*)

To disable the logo screen, restart Win98 like you did for Safe mode, but choose Step-By-Step Confirmation from the menu and type Y at each prompt (this method bypasses the startup logo screen). Once Windows starts, you will edit the Msdos.sys file, which is created by Windows setup and can be used to personalize the boot process.

Click the Start buttona and select Find and then Files Or Folders. In the Named field of the Find: All Files window, type msdos.sys. In the Look In field, select your boot drive (drive C: or drive H:, if drive C: is compressed) and click Find Now. When the computer locates the Msdos.sys file, right-click it and select Properties from the resulting pop-up menu. Next, clear the Read-only and Hidden checkboxes and click OK. This will allow you to edit the file.

Now, right-click the Msdos.sys file again and select Open With. In the Choose The Program You Want To Use box, click WordPad and then OK. Add the following line to the [Options] section of the Msdos.sys file:

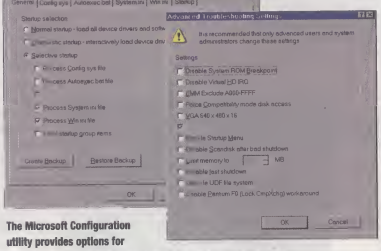
Logo=0

Save the document and then quit WordPad. Once again, right-click the Msdos.sys file and select Properties. Click the Read-only and Hidden checkboxes to select them to set these attributes for the file and click OK. Close the Find window. Finally, quit and then restart Windows in normal mode to see if this resolves the problem.

Your computer's CMOS settings are not correct. Check the documentation that came with your computer regarding how to check these settings and what they should be. Older chips have several known conflicts with Win98, including the Plug-and-Play function and IRQ Steering, a feature that allows more than one expansion card to share an IRQ (interrupt request line). If you cannot confirm your CMOS (complementary metal-oxide semiconductor) settings, contact the manufacturer and ask for updates.

The Registry may be corrupt. To check the Registry from outside Win98, restart the computer, press and hold the CTRL key (or F8 on some computers), choose Command Prompt Only when the Windows Startup Menu appears, type **scanreg** at the prompt, and press ENTER.

If you receive an error message indicating that your Registry is damaged, you should install Win98 in a clean folder. The Win98 Registry is a critical component of the system, and incorrectly editing it could further damage the Windows installation. As a result, we do not recommend that the average user attempt this process.



The Microsoft Configuration utility provides options for selective startup, which helps identify problematic system files.

There is a hardware problem. Hardware problems include BIOS (Basic Input/Output System) settings for your expansion cards, IRQ conflicts, redundant COM ports (for example, two COM 1 ports), and defective memory modules. Refer to the previous section, Test Your Hardware for troubleshooting routines.

Your computer has been infected by a virus. If this is the case, you should contact an antivirus specialist for further assistance. Both McAfee (http://www.mcafee.com) and Symantec (http://www.symantec.com) maintain virus update centers that can help you scan your computer for viruses and infected files. If you're not sure you have been contaminated, you may want to perform a clean installation as discussed in the previous section, but be warned that using your computer if a virus is present can potentially cause additional damage.

The troubleshooting information here should help you resolve 95% of startup problems. However, the process can be tedious and time-consuming, depending on how deeply buried the problem is. If your Win98 installation is newer or if you haven't installed many programs or devices, you may want to consider starting from scratch right away. LS

by Jennifer Farwell

The troubleshooting information here should help you resolve 95% of startup problems.

If I could record any show forever I would record the classics like Gunsmoke, Columbo, and Felicity.

* You won't believe what you can do with ReplayTV. It's not a VCR — it's a digital video recorder, so you can actually pause live television and do your own live instant replays. It also has a search engine, so you can punch in a keyword, say, "Golf," and it will find and record any golf program that comes on — all without videotape. Or just punch in the name of your favorite show, and ReplayTV will find it and store every episode so you'll never miss them again. All this and a free lifetime subscription are why ReplayTV is the critics' choice.* Call us at 877-replaytv or visit www.replaytv.com.

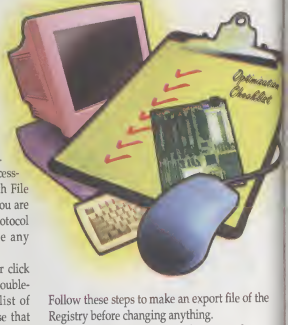
replaytv some televisions have all the fun.

Available at Best Buy, Circuit City and Amazon.com

*Based on head-to-head reviews in *Satellite Business News*, 7/19/00; *Philadelphia Daily News*, 6/16/00; and the *LA Times*, 5/4/00.

How To . . .

Optimize System & Operating System Performance



Ah, that nice new PC. You spent so much money and had such high hopes for it: the speed, the capacity. Suddenly, you find yourself aggravated. Why is it so slow now? What happened? Were you swindled, or do you just need to perform some basic maintenance? A little time on your part might rekindle that initial romance you felt the day you brought that new computer home and couldn't wait to spend the rest of your life tinkering with it.

We're providing these basic tips as guidelines. Not all of them will improve performance on all PCs. It is very important to record what you are doing at each step, in case there are problems. While this information has been tried and tested on other computers, the very fact that you are modifying internal system settings should tell you that such modifications could be potentially hazardous to your PC.

Check network settings. When it comes to bindings (links from various programs to others, letting them know each others addresses), remove any protocols not currently in use, such as NetBEUI, which is not routable. If you are going through a router and accessing files on your local network through File and Print Sharing, remove NetBEUI. If you are on a TCP/IP (Transmission Control Protocol /Internet Protocol) network, remove any NWLink or IPX/SPX protocols.

Right-click Network Neighborhood or click Start, Settings, and Control Panel and double-click Network. Browse through the list of installed components and remove those that do not apply. Always make a note of what you have removed and be ready to add it back in if problems occur.

Defrag often. As data is written to the hard drive of your computer, it can become fragmented. Fragmentation happens when there is not enough contiguous space on your hard drive to hold the entire piece of data that is being written. When this happens, the computer arranges to put the data into several different areas of the hard drive. However, later, when you need to read the data, the hard drive has to go to many different places and collect each of those pieces of data before the computer can form it into something useful. This results in latency between the time you try to execute a program or read a file and the time it actually takes to execute or read. To reduce fragmentation, there is a utility called Disk Defragmenter. Find it by going to Start, Programs, Accessories, and System Tools and selecting Disk Defragmenter. Follow the prompts and defrag will do the rest. Be patient. While defragmenting a hard drive that is severely fragmented can take quite a while, frequently over an hour, the gains can be well worth it.

Keep the Registry clean. The Registry is a database of software and hardware information. If it grows very large, your PC's performance can slow down. Be very careful: Editing the Registry can be a hazardous thing to do. Follow these steps to make an export file of the Registry before changing anything.

1. Click the Start button, click Run, and type **regedit**. Click OK.
2. In the Registry Editor, select the key you want to back up.
3. From the Registry menu, choose Export Registry File.
4. In the Save In list, select the folder where you want to save the backup.
5. In the File Name box, type a name for your backup file, such as Options or Backup.
6. In the Export Range box, be sure you've checked Selected Branch.
7. Click Save. The file is saved with a .REG extension.

To help keep your Registry clean, you can use the Microsoft utility Regclean, to automatically fix Registry errors and clean up the structure of the database. Regclean is available for free from Microsoft downloads (http://download.microsoft.com/download). You'll need to do a search using Keywords. Select Windows 98 in the Operating System field, and type **regclean** in the Keywords field. Click the FindIt! button. Click the 801KB (kilobyte) file to begin the download.

Manage the software environment. Remember to remove software by uninstalling it, rather than just deleting the folder. This preserves hard drive space, removes unneeded files and Registry entries, and keeps the system run-

What You Need To Know

Benefits
Help improve your PC's performance; get back some of its initial speed

Time
15 minutes to several hours

Skill Level
Easy to Difficult

Cost
Free to about $50

ning smoothly. Just deleting a folder can create problems ranging from annoying error messages to rendering certain packages unusable.

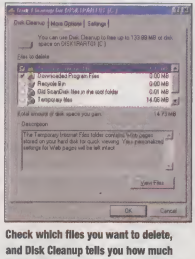
Remove unneeded or unwanted programs from the System Startup folder to keep them from loading at boot time. This will help the system boot up faster and let you continue with your work or play.

Clean out the C:\WINDOWS\TEMP folder. These files are for temporary use, and you can remove them without causing harm. These files usually are the result of improper shutdowns, crashes, or failed installations, and the files in this directory are unnecessary.

1. Double-click My Computer
2. Double-click the drive where Win98 is installed
3. Double-click the C:\WINDOWS folder and double-click the TEMP folder
4. Press CTRL-A to select all files and folders or click Edit, Select All
5. Press the DELETE key. When asked to delete these files, choose Yes To ALL

The Disk Cleanup utility helps you free space on your hard drive by removing files you don't need. You can launch it by navigating to Start, Programs, Accessories, System Tools, and Disk Cleanup. Disk Cleanup constantly monitors the status of your hard drive, notifies you when your drive is getting full, and provides a list of files you might want to delete. You can delete any type of unneeded file permanently, including Deleted files in the Recycle Bin, Temporary files, Cached Web pages that you don't use, and Downloaded Program files temporarily stored on your hard drive. When run as a separate tool, Disk Cleanup gives you even more control: It calculates how much space you can save by removing each type of file and offers descriptions and views of the files. You can even remove optional Win98 components that you don't use: Desktop Theme files, for example. You can also use Disk Cleanup to uninstall programs that you want to remove.

Increasing the size of the file and directory cache can result in increased speed when accessing the hard drive. To do this:


Disk Cleanup
More Options
Settings
You can use Disk Cleanup to free up to 133.89 MB of disk space on DRIVEPARTS (E:)
Files to delete:
Downloaded Program Files 0.00 MB
Recycle Bin 0.00 MB
Old ScanDisk files in the root folder 0.00 MB
Temporary files 14.66 MB
Total amount of disk space you gain: 14.73 MB
Description
The Temporary Internet Files folder contains Web pages stored on your hard disk for quick viewing. Your personalized settings for Web pages will be left intact.
View Files...
OK
Cancel

Check which files you want to delete, and Disk Cleanup tells you how much space you're freeing on your hard drive.

1. Right-click My Computer and click Properties.
2. Click the Performance tab and the File System button.
3. Click the down arrow next to Typical Role Of This Computer and select Network server.
4. Drag the Read-ahead Optimization slider all the way to Full and click OK.
5. You must restart your computer before the new settings will take effect.

Optimize hardware system settings. Right-click My Computer and select Properties. Under the Hardware tab, look for any devices that have a yellow exclamation point next to them. Try to resolve the error. If it is a driver, download the latest driver from the hardware manufacturer or from a driver support site, such as Drivers .com (http://www.drivers.com).

Device drivers are an important part of ensuring your hardware will work properly. Drivers define the hardware to the inner workings of your PC, so it is important to make sure you have the latest drivers. You can usually download drivers from the hardware manufacturer's Web site. Sub-scribing to a service, such as McAfee Oil Change, can help keep critical files, including drivers and antivirus definition files, up-to-date on your system. You get a one-year, free subscription with the Oil Change software that you can renew each year if you want. Visit McAfee (http://store.mcafee.com) and you can buy the standalone version of Oil Change for $29.95 or get McAfee Utilities Deluxe, which includes Oil Change, for $39.95.

Hard drives. Win98 PCs ought to be formatted with the FAT32 file system. If your drive was upgraded and has not been converted, there is a one-time, one-way conversion called Drive Converter located at Start, Programs, Accessories, System Tools, and Drive Con-verter. FAT32 provides more efficient use of your hard drive.

You should partition large hard drives into smaller, logical drives. This reduces the cluster size on the drive, letting it store smaller files more efficiently. To divide a hard drive into smaller partitions, set up the partitions with FDISK or with a third-party package, such as Partition Magic (http://www.powerquest .com). The advantage to a third-party package is that you can resize partitions without losing data; FDISK is a utility included with Win98, but to use it, you'll have to destroy all data on a partition and rebuild it from scratch.

Memory. To run effectively, Win98 PCs should have a minimum of 32MB (megabytes) of RAM (random-access memory); above this amount, performance gains are realized for more memory up to about 96MB to128MB, after which the incremental gain in performance is not worth the cost. One problem frequently encountered with PCs involves virtual memory settings. Virtual Memory is a portion of your hard drive that is used as a slower alternative to RAM to store "pages" of memory.

To decrease the amount of swapping and hard drive access thrashing:

1. Right-click My Computer and click Properties.
2. On the General tab in the System Properties window, look for the amount of RAM in your PC.
3. Click the Performance tab and click the Virtual Memory button.
4. Click the Let Me Specify My Own Virtual Memory Settings radio button
5. Click the down arrow next to the Hard Disk field.
6. Use these guidelines to choose the best location for your virtual memory file.
   a) Select the quickest hard drives on your PC
   b) If you have two hard drives with similar performance parameters, select the one that does not have Windows system files
   c) Make sure the drive has free space equal to at least twice the size of the recommended swap file size
7. Set the Minimum and Maximum size settings to 128MB and click OK
8. After setting the size of the virtual memory file, Win98 will display the message: You Have Chosen Not To Let Windows Manage Virtual Memory Automatically. Click Yes
9. You'll be asked, Do You Want To Restart Your Computer Now? You'll need to do so before the new settings will take effect, so click Yes

Miscellaneous Optimization Tips.

To enable use of hardware accelerator functions that are built into your graphics card, perform the following tasks:

1. Right-click My Computer and click the Performance tab.
2. Click Graphics.

3. Set the Hardware Acceleration slider all the way to Full and click OK.

Speaking of video, setting your screen resolution to SVGA (Super Video Graphics Array) may increase screen space and give a clearer image. Most monitors manufactured in the last three years are SVGA capable. If you have an older model or you are unsure, check the documentation that came with your monitor or consult the manufacturer's Web page.)

1. Right-click an empty portion of the Desktop and click Properties.
2. Click the Settings tab.
3. In Display Area, if you have a 15-inch monitor or smaller, set it to 800 x 600, and if you have a 17-inch monitor or larger, set it to 1,024 x 768 or more.

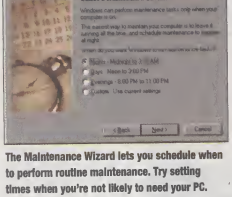
You may need to restart your computer before the new settings will take effect.

It is best to remove all unneeded drivers from the Config.sys file. Ideally, Config.sys should be empty, assuming that you run all your applications and games from Win98. However, if you boot to MS-DOS mode, then the settings in this file are necessary and you should skip this. DOS-based real-mode drivers operate in 16-bit mode, which consumes conventional memory and can cause stability problems.

1. Copy Config.sys to Config.old for a safe backup.
2. Restart your PC and make sure all of your devices work. Check system devices, such as CD-ROM, sound, modem, and other devices.
3. If a device is not working or not detected in Win98, go to Add New Hardware. Click Start, Settings, and Control Panel and double-click Add New Hardware and in the Add New Hardware Wizard, click Next. The automatic detection procedure may take approximately 5 to15 minutes. It installs support for devices that were previously controlled by DOS drivers.
4. Restart your PC. In some cases, Win98 will not be able to find all of the devices and install the proper drivers on legacy systems. In addition, some devices might require additional drivers.
5. After attempting to reload drivers, if your device is still not functioning, restore the original lines from Config.old to Config.sys.

To tune the Msdos.sys file, which is used to specify startup options before Win98 starts:

1. Remove the read only and hidden attributes on Msdos.sys in the root directory on your Windows drive (Right-click My Computer, select the drive on which your WINDOWS files reside, click View from the Menu bar, and click Folder Options. Select the View tab and under Advanced Settings, remove the check mark from the Do Not Show Hidden Or System Files. Click OK.)
2. Make a backup copy of Msdos.sys to Msdos.old.
3. Edit Msdos.sys with Notepad.
4. Find or add a line containing the appropriate settings. Some recommended values include:


Maintenance Wizard
Select a Maintenance Schedule
Windows can perform maintenance tasks only when your computer is on.
The easiest way to maintain your computer is to leave it running all the time, and schedule maintenance to happen at night.
When do you want Windows to perform maintenance tasks?
Nights (Midnight to 3:00 AM)
Days (Noon to 3:00 PM)
Evenings (5:00 PM to 11:00 PM)
Custom (Use current settings)
< Back
Next >
Cancel

The Maintenance Wizard lets you schedule when to perform routine maintenance. Try setting times when you're not likely to need your PC.

a) BootDelay=0, removes the two second delay when the PC boots up
b) AutoScan=2, automatically runs ScanDisk when Windows does not Shut Down properly. (This is only available in Windows 95 B(4.00.1111) or later)
c) DblSpace=0 (Do not set this to 0 if you are using a disk compression program because this setting disables automatic loading of the DoubleSpace disk compression driver)
d) DrvSpace=0 (Do not set to 0 if you are using disk compression because it disables the automatic loading of the DriveSpace disk compression driver)

5. Save the Msdos.sys. The new settings will take effect when you restart your PC.

Automation & Utilities. To help manage your PC, take advantage of the Windows Maintenance Wizard. You can schedule events for times when the computer is not in use, reducing the time you have to wait while they run. To open this wizard, click Start, Programs, Accessories, System Tools, and Windows Maintenance. To walk though the steps to customize the tune-up, choose Change My Tune-Up Settings Or Schedule. In the resulting dialog box, you must select either the Express or Custom Setup option.

In addition to scheduling tune-ups, you can use the Windows Maintenance Wizard to force an immediate tune-up. Choose Start, Programs, Accessories, System Tools, and Windows Maintenance. Select Tune Up My Computer Now and click OK.

Win98 has a memory-management improvement over Win95, designed to work with FAT-32 and with programs compiled specifically to run on Win98. When running a program in Win95, the operating system makes two copies of the program: one in the disk cache and the other in the memory staked out to run the program. When the program is copied from cache to active memory, it is copied in 4KB (kilobyte) blocks because this is the minimum amount of memory that the virtual-memory manager can address at once. This is redundant, as two copies of the program are stored in memory at once.

Win98 has a more efficient way of using the memory in the disk cache. If a program is already prealigned into 4KB boundaries, which must be done when it is compiled, Win98 can run the program directly from the cache, saving both CPU time and memory because there is no need to perform the copy operation from cache to active memory.

While programs written for Win98 are already aligned on 4KB boundaries, Microsoft also has a utility called WinAlign (Walign.exe, located in C:\WINDOWS\SYSTEM or whatever drive your WINDOWS file is on) that takes an existing program and realigns it on 4KB boundaries. Some programs will experience compatibility problems if you do this so make a backup.

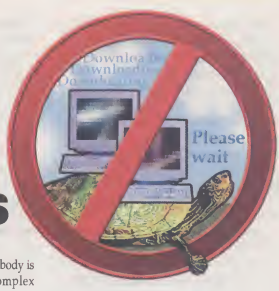
TweakUI improves your PC's responsiveness by letting you tweak (hence the name) Windows settings that users don't normally touch, including menu speeds, your mouse's double-click sensitivity, and time- and CPU-cycle-wasting animations. Find TweakUI in the C:\TOOLS\RESKIT\POWERTOY directory. Right-click TweakUI.inf and select Install. After it installs, open Control Panel, click the TweakUI icon and go to town.

These tips can help improve your PC's performance, returning it to the machine you had when you first got it. While these tips will work for most machines, some PCs have vagaries that might not let you make or retain changes. Make sure you recall what changes you made in case you need to undo them. Experiment to see which ones improve your system performance; this might also let you identify bottlenecks, further enhancing your computing. LS

by Elliott Elrod

How To . . .

Prevent & Troubleshoot System Slowdowns



Remember that sleek, lean, mean computing machine you purchased some months (or years) back? Has it slowed down lately? Become a little stodgy, more than a bit sluggish? Do tasks that used to take seconds now take minutes? There are things you can do to prevent or correct such bottlenecks. By placing your computer on a steady diet of preventative and restorative measures, you can speed up that machine of yours and guarantee a longer, more useful life for your PC or laptop.

What You Need To Know

Benefits
Faster Startup, less likelihood of slowdowns and system crashes, and faster operation of applications

Tools
Possibly software, such as Norton CleanSweep, and an appropriate type of memory for your system (and a screw or nut driver to remove case to install it, if necessary)

Time
15 to 30 minutes or more

Easy to Difficult

Skill Level
Easy to Difficult

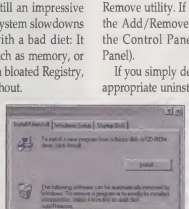
$$$ Cost
Free to more than $125 (for memory)

Possible Causes. The human body is perhaps the most wonderful and complex "machine" we know of. Yet, even that exquisite instrument, when fed a diet lacking in certain nutrients or one that contains an excess of fat or cholesterol, will begin to falter; eventually it will fail altogether. Your computer, not as complex as your body but still an impressive mechanism, is no different. System slowdowns boil down to a computer with a bad diet: It either lacks certain things, such as memory, or it has certain things, such as a bloated Registry, that it would be better off without.

This article will present an inventory of issues that can cause system slowdowns and provide instructions on how to deal with them.

A bloated Registry. The Windows Registry is a clever piece of work. Essentially, it's a database that contains, among other things, information about all of the software you've installed. When you install an application, its installation program places in the Registry information about which files the application placed on the hard drive and where.

Among other things, this makes it easy to remove an application; when you invoke (start up) the application's uninstaller, it will check the Registry to see exactly what it should delete. Then it will remove exactly the files it should, no more and no less. And, perhaps most importantly, after removing the application's files, it will then delete its own Registry entries.


Install/Uninstall
Windows Setup
Startup Disk
Install
The following software can be automatically removed by Windows. To remove a program or to modify its installed components, select it from the list and click Add/Remove.
Add/Remove...
OK
Cancel

Windows' Add/Remove Programs utility, in Control Panel, can remove applications, including Registry entries, even if the application did not include an uninstaller.

This is why you should not "remove" an application simply by using Windows Explorer to delete the application's files. Instead, use the software's Uninstall or Remove utility. If it doesn't have one, then use the Add/Remove Programs utility located in the Control Panel (Start, Settings, Control Panel).

If you simply delete files instead of using the appropriate uninstaller, you will probably miss some; after all, most applications place files in several places, including the C:\WINDOWS\SYSTEM folder and other locations you may not think to check. Most importantly, manually deleting the files will not delete the Registry entries. The result is a bloated Registry, containing entries that point to files that are no longer present; your system will spend a great deal of time attempting to resolve those invalid entries every time you boot up and occasionally even while processing other tasks. So, when deleting applications, do it in the approved manner to avoid slowdowns.

If you have already uninstalled applications by simply deleting files or if you have other reasons to think that your Registry could use a good cleaning, try one of the commercial cleaner applications, such as Norton CleanSweep (http://www.symantec.com).

Too many fonts. If your computer came with any software at all already installed, it probably also came with a robust complement of fonts, perhaps as many as 300 or so. If you've installed other software since, especially word-processing or desktop-publishing software, you may now have 500 or more fonts residing in your Fonts folder.

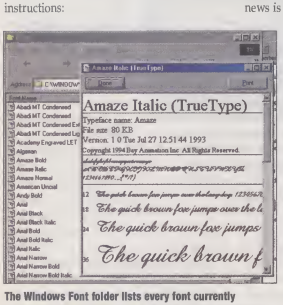
You don't need all of these fonts. Yes, they're cool, and Aunt LaVerne just loves receiving those letters typed in Old Dreadful No. 7, which is shown here:

> "Hi, Auntie. Everything's great down here on the farm. Yes, Uncle Warren is finally out on work-release."

But be honest; do you really *like* this typeface? Could you even read the preceding sentence? Can you think of any reason why you'd want to use this, well, dreadful font? (Yes, it's a real font, and it's really called Old Dreadful No. 7.)

Frivolous Fonts. When Windows boots up, one of the first things it does is check the Fonts folder and then load all of the fonts present so that they'll be accessible from whatever applications you're running. The problem is that all of those fonts eat up resources, and they slow down your system, especially on boot up.

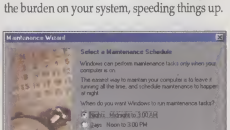
What can you do about it? Well, the first thing is to realize that no one outside of a professional graphic designer really needs 750 fonts. To get rid of some, follow these instructions:



The Windows Font folder lists every font currently installed on your system. Double-click a font to see a display window. To remove a font you don't need, select it and press the DELETE key.

Double-click My Computer to open it, then double-click the Control Panel icon, and then the Fonts folder. The system will display a list of all of the fonts (or a series of font icons, depending upon how you've set your view) currently installed on your computer. Double-click any font to see examples of it. If it looks like something you'll never use, select and then delete it. If you still have the application that installed the font, whether that's a word processor, a desktop-publishing application, or Windows itself, you can always reinstall it later.

Get your total number of fonts down to 100 or 150 if you can. That will lighten the burden on your system, speeding things up.


Maintenance Wizard
Select a Maintenance Schedule
Windows can perform maintenance tasks only when your computer is on.
The easiest way to maintain your computer is to leave it running all the time, and schedule maintenance to happen at night.
When do you want Windows to run maintenance tasks?
Nights - Midnight to 3:00 AM
Days - Noon to 3:00 PM
Evenings - 8:00 PM to 11:00 PM
Custom - Use current settings
< Back
Next >
Cancel

Defragmenting your hard drive can take 30 to 90 minutes or more, depending on the size of the hard drive and just how fragmented it is.

A fragmented hard drive. This may be one of the biggest bottlenecks of all. The good news is that it's easy to correct and, once you defrag (defragment) your hard drive, you may notice an immediate and significant increase in system performance.

When Windows saves a file to your hard drive, it doesn't save it all in one place. That is, the data that makes up the file isn't normally stored in one contiguous stream so that the entire file resides in one spot on your hard drive. Instead, Windows stores pieces of the file all over the hard drive and uses an FAT (file allocation table) to keep track of which pieces are located where. Over time, files become more and more fragmented throughout the drive, and the system spends more and more time hunting for all of the pieces when it needs to read the file. The result is slower access to data and applications.

To combat this, Windows has supplied a utility called Disk Defragmenter, which will gather all of the related pieces of all of your files and store them together. Here's how to use this handy tool:

Go to your Start menu and select Programs, Accessories, and System Tools. From the list, choose Disk Defragmenter. Choose the drive you wish to defragment.

Click Settings and then check the Rearrange Program Files So My Programs Start Faster box. Click OK to start the utility. Run this utility every few weeks to keep access to your hard drive as fast as possible.

Disk Defragmenter can take anywhere from 20 minutes to 2 hours to run, depending upon the size and number of your drives.

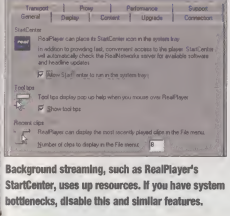
Multitasking. To those of us who worked for so long with single-task-oriented DOS (Disk Operating System), the advent of true multitasking was a boon for which we had been waiting for years. Suddenly, we could actually set the computer to a task (for example, a download), and that task could continue while we did something else, such as work on a document or browse another Web site.

But every rose has its thorns. Microprocessors, even today's more powerful ones, can only do so much before they begin to bog down. If you have multiple applications open, especially if, but not *only* if, they're each working on tasks, overall speed will suffer; the multiple tasks will indeed get processed, but that processing will take place more slowly than if any one of the activities were the only one taking place.

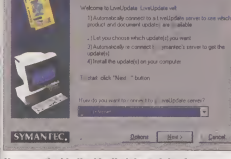
Some instances of multitasking-related slowdowns are very obvious. If you're installing a program while you download an application while you're working on a word-processing document, it's pretty obvious that you're multitasking in a big way. If your system is being strained, it'll show that strain by slowing down. If that's the case, either add more memory (see below) or just try to do less at the same time. Just because you *can* multitask doesn't mean that you must.

Remember, too, that having an application open can eat up resources even though you're not actively working on a task. Most applications have their own internal processing going on even when you're not doing anything. These housekeeping tasks can suck up processor cycles and slow down your system.

There are also some less obvious instances of multitasking. If you have a persistent Internet connection, such as a T1 line or DSL


Preferences
Transport
Proxy
Performance
Support
General
Display
Content
Upgrade
Connection
StartCenter
RealPlayer can place its StartCenter icon in the system tray.
In addition to providing fast, convenient access to the player, StartCenter will automatically check the RealNetworks server for available software and headline updates.
Show StartCenter icon in the system tray
Tool tips
Tool tips display pop-up help when you mouse over RealPlayer.
Show tool tips
Recent clips
RealPlayer can display the most recently played clips in the File menu.
Number of clips to display in the File menu:
6

Background streaming, such as RealPlayer's StartCenter, uses up resources. If you have system bottlenecks, disable this and similar features.


LiveUpdate
Welcome!
Welcome to LiveUpdate. LiveUpdate will:
1) Automatically connect to a LiveUpdate server to see which product and document updates are available
2) Let you choose which update(s) you want
3) Automatically reconnect to Symantec's server to get the update(s)
4) Install the update(s) on your computer
To start, click "Next."
SYMANTEC.
Options
Next >
Cancel

You can disable the LiveUpdate updates for Symantec's Norton AntiVirus. Do not disable your real-time system antivirus software; any increase in performance is not worth the risk.

(Digital Subscriber Line), that connection opens the door to certain types of streamed updates of which you may not even be aware. For example, RealPlayer, when an Internet connection is present, can check for news alerts and headlines without your knowledge.

And if something new arrives, you may notice the Real icon in your System Tray blinking to alert you to that fact. Most virus-checkers behave similarly; by default, they poll for virus updates, warning you when they come across new virus information.

Of course, real-time virus-checkers consume system resources because they are continuously watching what's going on with your system in order to alert you if a virus is spotted. (See the Word Of Warning, below.) Windows itself, if Active Desktop is enabled, can poll for system updates, news, and entertainment, streaming them to your system in the background while you're occupied with other tasks.

None of this is necessarily bad, of course. These are tools that many users enjoy and find useful. But tasks such as these, running in the background while you are working on the computer, do consume resources, and they can slow down your system. If you wish to free up those resources, it's best to turn off such features.

Locate applications that perform background tasks, such as streaming or downloading content to your system. Applications that typically do so include RealPlayer (and other multimedia players), your browser, and Windows itself. In the application's Options or Preferences menu, turn off such things as Automatic Download, Content Subscriptions, and other similar features. In RealPlayer, for example, turn off the StartCenter. In Windows, you may want to turn off Active Desktop.

A word of warning: One of the applications you may have running in the background is your real-time virus-checker. Like any other background application, the virus-checker will use up resources and slow down the system somewhat. Here's our advice: Live with it. The virus-checker's job is too important to do without; don't sacrifice security for speed.

Not enough memory. Memory is like money: You can't have too much of it. And if you don't have enough (memory, that is), you will definitely notice your system slowing down. Your 32MB (megabyte) machine may have been fine running Windows 95 two years ago. But now you're running Win98, which can accomplish more than its predecessor, but which requires additional memory to efficiently do so. Also, you're probably now running newer versions of your favorite applications. Like the operating system itself, these newer applications do much more than previous versions, but they also require more memory and more hard drive space.

Windows is smart enough to try and make up for the fact that it's running low on memory by "swapping" hard drive space for memory. Whenever an application requires memory that is not present, or, more accurately, is being used for something else, Windows will set aside a chunk of hard drive and use that as if it were memory.

This is a clever idea, and it works rather well. But there is a tradeoff: hard drive access is much slower than access to real memory. The result is an application that lugs along, accomplishing its task, but at a snail's pace.

The solution is almost always more memory. If you wish to run Win98 and its applications efficiently, you just can't do it with 32MB of RAM (random-access memory). You need to be running 64MB, 128MB, or more if possible. Adding memory will almost certainly revitalize your system, speeding up slow applications, including the operating system itself. And it's fairly affordable: At press time, you can purchase 32MB for $90 or less. Memory prices tend to be volatile, however, so don't count on this dollar figure. Then again, they're volatile in both directions; the price may just as easily go down.

Exposing the newest weak link. Let's assume that you just purchased and installed more memory. You will definitely see an improvement in your computer's speed, but it may not be all you had hoped for. Why? Well, perhaps you're running an older hard drive with a rotational speed of, say, 3,500rpm (revolutions per minute) and an access time of 15ms (milliseconds). Today's drives typically rotate at 5,000rpm or better and have access times in the 8 to 9ms range. Does that mean that there's something wrong with your drive? No, not really. It simply means that the mechanics of your older drive will limit the performance you can expect from it and therefore from your system as a whole.

Similarly, if you've upgraded your drive but not your memory, there's only so much benefit you can gain from having a faster hard drive; your system may still bog down when its memory gets used up.

Unfortunately, this means that, by improving one area, you may have uncovered the newest weak link. In the first example, that new weakness is your hard drive. Should you replace it? Not if it, and the computer, are doing the job for you. But, if you need still more performance, that's probably the next place to look.

The Balanced System. Your computer is a complex system comprising many pieces of hardware and software, all of which must work well together for optimum results. Eliminating the bottlenecks that result in system slowdowns is one major step in that process. LS

by Rod Scher

How To . . .

Troubleshoot Software Installations

What better friend could a procrastinator have than a computer? That's what you're thinking as you install software to create a newsletter the day before you plan to mail it out. Or when you install a tax preparation program on April 15th. It often seems that just when your timeline has no room for error, the software installation gremlins attack.

You know the culprits—General Protection Fault and his troops. They hang up the installation or they let you install the software but then won't let you run it. What do you do next? The temptation is to try anything and everything, but that may only make matters worse.

"First, take a step back and uninstall the program," says Robert Stephens. He's founder of the Geek Squad (http://www.geeksquad.com), a Minneapolis-based computer service company, and author of "The Geek Squad's Guide to Solving Any Computer Glitch."

"Every time you add software, it's like going under the hood of your car and rerouting some hoses," Stephens says.

The following steps for troubleshooting software installation are recommended by Stephens and/or a team of Microsoft product specialists:

Uninstall The Program. Uninstall the new program using the Add/Remove Programs feature of Windows 98. From the Start menu, select Settings, Control Panel, then double-click the Add/Remove Programs icon. From the programs listed in the Install/Uninstall tab, highlight the one you want to remove and click the Add/Remove button at the bottom. Click Yes, then click OK.

Consider The Source. Read the software box. "Just because the box says the software is Windows 98 compatible doesn't mean it is," says Stephens.

Is the software from a reputable vendor? Is there a technical support phone number on the box? "If the company isn't there to help make the installation easy, how good can the product be?," Stephens says.

Reputable software manufacturers work hard to make their software compatible with each upgrade of Windows. Incompatibility problems usually occur with software from questionable sources or with outdated versions of programs and video games.

According to a Microsoft Windows 98 representative, an application may overwrite a current core system file with either an older version of the file or a version tweaked by the vendor to fit its application. Because applications share the same system files, an altered file can wreak havoc. That's why this condition is called "DLL Hell."

Windows will warn you during the installation if it detects incompatibility issues. Click Details to find out if the issues are reconcilable. It may simply be a matter of getting an updated version of the software. As a safeguard, Windows does not display the Run Program button if installing the software would seriously damage your system.

Clean House. Free up space on your hard drive. A common installation problem occurs when the new application eats up too much space. Check the amount of available space. From the Start Menu, select Programs, Accessories and System Tools and click System Information.

You'll see how many kilobytes (KB) are being used out of the total number on your hard drive, as well as the percent of your drive that's available. At least 10% of your hard drive should be free after you install the program. There are several ways to free up space. Remove programs you seldom use (using Add/Remove Programs), backup and delete old data files, and run the Disk Cleanup utility to empty the Recycle Bin, Internet Cache, etc.

From the Start Menu, select Programs, Accessories, System Tools and click Disk Cleanup. Select the hard drive (most likely C:) and click OK. Compressing files to save space is not a good idea. While you're looking at System

What You Need To Know

Benefits
Taking the proper steps to fix a software installation problem will result in smooth running programs and will safeguard your system from a costly, time-consuming crash.

Time
Allow 1 hour or more to go through the troubleshooting steps

Easy to Intermediate

Skill Level
Easy to Intermediate

$$$

Cost
Most solutions are free. Microsoft technical support may cost $35 per incident. Ontrack EasyRecovery begins at $89

Information, note how much RAM your system has. Most programs today require at least 32MB (megabytes) to run efficiently.

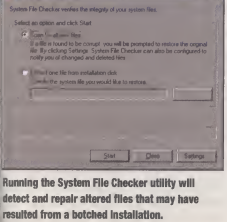
Disinfect. Check your system for a virus. Some viruses can sneak in under the radar, and you won't notice them until you try to install new software.

"Almost every computer that we work on has a virus on it," says Stephens. "Most viruses aren't lethal, but they certainly can confuse the symptoms." One pesky example is a Trojan horse that slaps a "write-protect" order on a system.ini file, which will prevent the software installation from writing to that file.

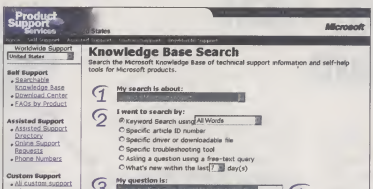
To detect and clean up a virus, run a current antivirus program. You'll probably need to bring your antivirus program up to date by going to the manufacturer's Web site and downloading the latest update. If you don't have a program, go to the McAfee Web site where you can download one for a free trial. If a virus is detected and cleaned up, try installing the software again. (Your software documentation may advise you to disable the antivirus program before installing the software.)

Check The Disc. If you're installing an application from a CD-ROM, check to make sure it's free of fingerprints, scratches, etc. If it's dirty, you can use a lint-free cloth to wipe it off or wash it with warm water and dry it. If it's scratched, exchange it.

Help From Windows. The Windows 98 Help feature has a number of diagnostic and repair tools. From the Search Menu, click Help, then click the Index tab and type **system**. Select System Faults, Diagnosing and click Display to learn what these tools can do and how to use them. Also listed in the Help index is System File Checker. According to a Microsoft Windows 98 representative, this tool lets you fix a system file that has become corrupted during the software installation. System File Checker will install the original file from your Windows 98 CD-ROM.



Running the System File Checker utility will detect and repair altered files that may have resulted from a botched installation.



Sometimes the answer to your software installation problem can be found by doing a Knowledge Base Search of Microsoft's technical support information and self-help tools.

Microsoft Knowledge Base. Sometimes the answer to your software installation problem can be found by using Microsoft's Knowledge Base Search feature to find technical support information and self-help tools. Go to the company's Contact Support page (http://www.microsoft.com/windows98/support/contact) and click the Microsoft Windows 98 Support Web Site link. This feature is especially useful when you're installing a product that is known to have an incompatibility glitch. Incompatibility most often occurs with non-Microsoft software.

More support resources, including phone numbers, FAQs by product, online support request, etc. can be found online on a Microsoft Product Support Page (http://support.microsoft.com/directory). This will lead you to specialized support for Microsoft products including Windows 98, Internet Explorer, games and multimedia, and more. If Windows 98 came preinstalled on your computer, you can also turn to the computer manufacturer for support.

Help From The Manufacturer. If someone other than Microsoft manufactures the software, go to the company's Web site or call its technical support number. The company may know what would cause its software to be incompatible with Windows 98 and can probably offer a solution. Also, if the problem is outmoded software, they can send you an updated version or they'll have it available for downloading from their Web site.

Can't Boot? Most of the previous steps assume you were able to boot Windows 98. But what if you can't? If you've made an Emergency Recovery diskette, use it.

If not, Stephens recommends recovery software and services from Ontrack (http://www.ontrack.com). "They're the people who help the FBI recover data," he says.

One Ontrack product is EasyRecovery ($89 for the Personal Edition, $489 for the Professional Edition needed to recover data from multiple computers supporting multiple operating systems), which includes an emergency diskette for booting the system. A free trial version can be downloaded. (Ask a friend to help if your system has crashed.)

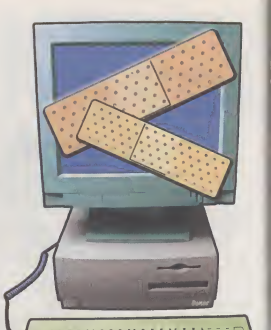
A feature on the Ontrack Web site can show you which files the program can recover. The company also offers Remote Data Recovery, determining what is recoverable and doing the recovery in a matter of a few hours through a modem or Internet connection.

Leave It To The Pros. One last point. When should you surrender and take your computer to a trained professional? A Microsoft representative advises leaving anything that requires opening the PC to a technician. This would include such things as adding memory or a new hard drive. Also, only very knowledgeable users should edit the Registry or change hardware settings. Even if you end up having to take your computer to the shop, going through the steps above will give you information that can save a technician's time and your money. LS

by Leanna Skarnulis

How To . . .

Fix Existing Software That Won't Run



Life is full of frustration. For computer users, one major source of frustration is when a program that was working beautifully one day refuses to work the next. There are many possible reasons for this and almost as many possible solutions, which we're glad to share with you here. With a little detective work and some patience, you can get most programs up and running again.

Missing Or Corrupt Files.

Programs sometimes display an error message that can help you diagnose a problem. Messages such as "can't find file xxx" or "missing xxx.dll" are good indications that a required file is either missing or corrupt. A corrupt file is usually caused by a system crash as the file is being accessed. Files can turn up missing when you uninstall another application. A program's uninstaller may delete shared files called **DLLs (dynamic-link library files**, a library of executable functions or data that several applications can use at one time). Your system can also lose files when you delete programs to free hard drive space.

Fixing a missing file problem is a simple matter of reinstalling the file. Most of the files a program needs come with its installer; in many cases, running the installer again is all you need to do to replace the missing files.

Corrupt files are a bit trickier. An installer can't recognize a file as corrupt, and some installers won't replace existing files, so simply reinstalling the software won't swap out the corrupt file for the good file. In this case, change the name of the corrupt file and then rerun the installer.

If you still get a missing file error message, the file you need probably isn't included in the installer. It may be a file that is normally installed by your computer's operating system. Windows keeps a backup directory of all the system files and DLLs that it originally installs. Before digging out your Windows CD and reinstalling the operating system, use Windows Explorer (Start, Programs, Windows Explorer) to look for a copy of the missing file in the Windows backup directory at C:\WINDOWS\SYSBCKUP. If you can't find the folder, it's probably hidden. Find it by clicking the View menu from the WINDOWS directory and selecting Folder Options. Then click the View tab and in the Advanced Settings box under the HIDDEN FILES folder put a check mark next to Show All Files. Click Apply, then OK. If you want to display hidden files in all folders, click the Like Current Folder button.

Once the SYSBCKUP directory is visible, open it and look for the missing file. If you find the file, copy it to its original location (as noted in the error message), then launch the program again. If this does not fix the problem or if you were not able to find the missing file, you will need to reinstall Windows. (For more information, see the Install Over Your Existing Windows section.)

Outdated DLLs.

Most program installers check the WINDOWS directory for any necessary DLLs and will install one if it is missing or is a different version than the existing DLL. The newly installed DLL may be newer or older than the existing DLL; either way, it can wreak havoc with existing programs. Newer versions of DLLs sometimes include bugs that were not present in earlier versions, and older versions may not be compatible with some programs.

DLLs may be stored in a program's directory or in the WINDOWS directory. DLLs stored in the WINDOWS directory are usually the only ones that cause conflicts, so you can install the correct version of a DLL in the program directory while retaining the current version in the WINDOWS directory.

First, write down the name of the problem DLL from the displayed error message. If you don't see the full pathname, click the Start button and select Find, Files Or Folders to search for it. Once you find it, right-click the file name and choose Properties from the pop-up menu. Select the Version tab and write down the version number. Rename the file by adding its version

What You Need To Know

Benefits
You will be able to fix software that was working before but is now acting up

Time
Minimal; depends on how long it takes to find the source of the problem in some cases

Easy to Intermediate

Skill Level
Easy to Intermediate

number; for example, Twain.dll might become Twain1601.dll. Next, reinstall the program.

Once installation is complete, check the version number of the DLL that you just installed. If it's an older version, move it to the program directory, then restore the original DLL to its original name. Now the older version required by the program is available in its directory while the newer version remains in the WINDOWS directory for other applications to use.

If the newly installed DLL is newer than the existing one, another program may have installed an older version. The other program may still work correctly with the newer version; if not, copy the renamed version to that program's directory, then change it back to its original name.

Program Conflicts. It's not unusual for programs to conflict with each other, causing a chain reaction of problems. Symptoms of program conflicts include inconsistent performance (sometimes a program works, sometimes it doesn't) and invalid page fault errors.

Programs usually fail only when the culprit program is active or was used before the failing program. Discovering these interrelationships can be difficult and time consuming. Start the troubleshooting process by restarting Windows and then relaunching the failing application. If it still fails, check which programs Windows launches automatically at startup. Then go to C:\WINDOWS\START MENU\PROGRAMS\STARTUP and move these programs from the STARTUP folder to your Desktop. Restart Windows and launch the application again. If it works, add one of the moved programs back to your STARTUP directory. Restart Windows and check whether the original application still works. Continue this process until the application fails again. Once you discover which applications are conflicting, contact the manufacturers to see if there are any workarounds or updates to correct the problem.

If none of the programs in the STARTUP folder are causing the conflict, note the programs that you used before or are active when the program fails. Armed with this list, use the same technique of starting a program, then launching the failing program to determine the cause of the conflict.

Program components. Conflicts can also occur between program components. (See the Outdated DLLs section above.) One of the most common is an invalid page fault error in module Kernel32.dll. A corrupt swap file can cause this error. The **swap file**, part of the virtual memory system used by Windows, is a reserved area on your hard drive used to temporarily store data from memory.

To fix a corrupt swap file, simply delete it. A new swap file will be created when you restart Windows. The swap file is called Win386.swp and is in the WINDOWS directory. (This file may be hidden; to see hidden files, see the Missing Or Corrupt Files section above.) Because the file is in use, you will need to restart in DOS mode by going to Start, Shutdown, Restart In MS-DOS Mode. Once restarted in DOS, you will see the C:\WINDOWS> prompt. Type **del win386.swp** and press ENTER. Type **exit** and press ENTER to return to Windows. Windows will now create a new swap file.

Shared Component
Shared File
C:\WINDOWS\SYSTEM\OSSDCK32.DCX
This is a shared component and there may be other applications using it. If you are sure you want to remove it, click the Remove button. Otherwise, click the Keep button.
If you want to remove all shared components, click the Remove All button. If you do not want to remove any shared component click the Remove None button
Keep
Remove
Remove None
Remove All

When you uninstall an application, be careful not to remove any files that may be shared with other applications, as is the case here.

Corrupt Registry. The Windows Registry, which is basically a table of contents for your computer, can also become corrupt, preventing programs from launching or working reliably. Windows checks the Registry automatically and keeps a backup of it for five days. If the program you are having trouble with worked correctly within the past five days and you haven't installed anything new, restoring the Registry may cure the problem. Restart your computer in MS-DOS mode by going to Start, Shutdown, Restart In MS-DOS Mode. At the C:\WINDOWS> prompt, type **scanreg/restore**, then press ENTER. The Scanreg utility will display the last five days of Registry backups; choose the backup from the last day the program worked properly. Reboot your computer and launch the program again.

Play it safe. Program installations usually make modifications to the Windows Registry. Before you install a program, back up the Registry. If the installation causes a problem, you will be able to return the Registry to its last known working state. To back up the Registry, go to Start, Run. Type **regedit** and then click OK to start the Registry Editor. From the Registry menu, select Export Registry File. Select a location to save the copy, then click Save. If you ever need to restore the Registry File, launch the Registry Editor and select Import Registry File from the Registry menu.

Demos, Shareware & Forced Registration. If a demo or shareware program has stopped functioning, the evaluation period has probably expired. Now you will need to decide whether you want to keep using the program. If you do, you can contact the author to register and pay for your copy of the product so you can keep using it. Contact information is usually included either on a program's splash screen or in a Readme file. Once you pay for the program, the author will supply a registration code to unlock it. The registration code may also unlock additional features that were not available during the evaluation period.

Some commercial programs force you to register by putting a limit on the number of times you can use the product. If you haven't registered by the time you hit the limit, the program stops working. Be sure to keep a written record of program registration codes in case you ever need to reinstall the programs.

Install Over Your Existing Windows. Sometimes Windows itself is giving you problems. Completely reinstalling Windows might solve these problems. Installing over your existing Windows is the quickest and easiest way to reinstall Windows. Back up any data files you may need, then insert the Windows CD into your CD-ROM drive. Click the Start menu, Run, type **d:\setup.exe** (substitute your CD-ROM's drive letter if different) in the box, and then click OK. Windows will now install on top of your existing installation, maintaining your existing settings and data but replacing any missing or damaged Windows files.

This type of installation may have some side effects. For example, you may need to reinstall some programs because Windows may replace some files with earlier versions. You will also need to update Windows because it is now at the same version level as the original Windows CD. You can find updates on the Microsoft Web site (http://www.microsoft.com). LS

by Tom Nelson and Mary O'Connor

How To . . .

Fix Missing Or Outdated Drivers

Device drivers are software that interfaces between your hardware and the operating system. They tell Windows what your hardware is for and give all the instructions for setting up the device and modifying its performance. A device, in this case, is any kind of hardware attached to your motherboard, such as a sound card, a modem, or a hard drive.

What You Need To Know

Benefits

Installing and updating device drivers will allow your computer to work more efficiently or to provide you with more functions for your current hardware. You can also switch drivers in order to resolve hardware conflicts or driver conflicts.

Time

Time can vary greatly depending on the complexity of your hardware and the conflicts involved. A slow connection for downloading new drivers can also increase the time, anywhere from 10 minutes (if you already have the drivers and there are no conflicts) to several hours.

Skill Level

Intermediate to Difficult

Cost

$$$

Drivers are usually included with your operating system or come with your hardware. Updated drivers and patches are usually free.

Installing Device Drivers. After you install your hardware, you reboot the computer. In most cases, Windows will notify you when it starts that it has found a new piece of hardware. Once the hardware has been found, Windows will try to identify the hardware and install drivers for it. In many cases, Windows will already have drivers available for your hardware, and it will install those drivers automatically.

If Windows doesn't have drivers for your hardware, or if it can't identify the hardware, you will need to tell Windows what the hardware is and where to find the drivers to install. The process you use to do this is the same process you will use to change the drivers if you decide to upgrade them at any time.

Windows will present you with the Update Device Driver Wizard. This wizard offers you two options: you can have Windows search for a driver for your hardware, or you can select from a list of all available drivers. If you want to install custom drivers, you should choose the second option. If you choose the first option, Windows will search its own files for a driver for your hardware. It will ask you for the location of the Windows drivers, which may be in the C:\WINDOWS directory or on the Windows CD-ROM. You can also specify other locations, such as a diskette or another directory on your hard drive.

When Windows finds a compatible driver, it will tell you so and will attempt to load the driver. If it cannot find a file it needs, Windows will again ask you for the location of the files. You may need to find the file on a diskette or on the Windows CD-ROM. (Most devices use more than one file as drivers.) The file will have the .INF extension, showing that it contains information about your hardware.

Finding A Driver. If Windows cannot find a compatible driver in its own listings, or if you have chosen to install a driver of your own choosing, you will direct Windows to use the .INF file in a directory of your choice. This will either be a disk or CD supplied by your manufacturer or from a driver file that you have downloaded from a Web site. If the downloaded file is in a compressed format (such as a .ZIP file), make sure you have extracted the files to a temporary location and that you know what directory they are in. If you regularly download and upgrade drivers, you may want to make a special directory for them to simplify this process.

You may find that there is more than one .INF file in your chosen directory. This is because some hardware, such as a sound card, will actually install more than one "device" for the card to use. It may install some sound emulations as devices or install the sound for your Joystick as a separate device. If this is the case, make sure you know which device to install first. The other devices will probably install themselves automatically once the base driver is installed. Contact the manufacturer if you have any questions.

If you have chosen an incompatible driver, Windows will not install it and will ask you to choose another one. Using the correct driver is

very important because your hardware will function poorly or not at all if you install the wrong drivers. Make certain that your drivers are for the exact make and model of hardware you are using and for the correct operating system as well.

Once Windows has installed the drivers, you will need to reboot before the changes take effect. If all is well, you should return to Windows without a problem, but if there is any kind of driver conflict, you may be booted into Safe mode instead where you can view your driver list and search for problems.

If Windows cannot identify your hardware, you will need to specify the type of device you are installing (multimedia, monitor, video, etc.) and specify the manufacturer. This information may also be contained in the driver files themselves. Then continue with the driver installation process as described above.

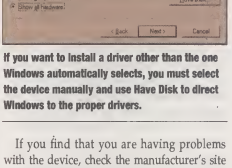
Upgrading Drivers. If you want to upgrade your drivers, you can access the Device Driver Wizard at any time from your Start Menu under Settings, Control Panel, System, Device Manager. When you access the Device Driver Wizard from the Device Manager window, you will need to select your device from the list of devices shown in the window, click the Properties button, the Driver tab, and then the Update Drivers button. This will take you to the installation screen described above.

If Windows does not automatically locate your hardware, it will not be listed in the Device Manager. In this case, use the Add New Hardware option in the Control Panel and Windows will attempt to locate your hardware. You may need to tell Windows what device type you have installed and what manufacturer it is from. However, if Windows can't find the hardware at all, you must resolve the hardware problem before you can install your device driver. The card may not be firmly seated in the slot, for example, or the cord may not be attached or may be attached incorrectly. Also check that the power supply is attached and plugged in if that is necessary. It is also possible that you have a defective device; if nothing else works, contact the manufacturer for technical advice.

Some manufacturers supply software that installs device drivers without using the Device Driver Wizard. Read the installation instructions for your hardware and follow the instructions there first.

Which Drivers Should You Use? In most cases you can simply use the drivers that Windows provides or the drivers that are packaged with your hardware. However, there are several cases where you might want to change or update the driver for a certain device.

Manufacturers often provide updated drivers for their products. This is done for several reasons. First, a manufacturer will provide new drivers in order to fix known bugs in the original drivers or to fix known conflicts with other devices. Any time you install new hardware it's best to check with your manufacturer to see whether any fixes of this type are available. Your manufacturer's Web site may feature an entirely new set of drivers or a patch file, which usually runs as an executable and doesn't require driver installation.



If you want to install a driver other than the one Windows automatically selects, you must select the device manually and use Have Disk to direct Windows to the proper drivers.

If you find that you are having problems with the device, check the manufacturer's site to see whether there is a known bug and a fix for it. You can save yourself days of trouble by doing this early.

You may also want to upgrade your drivers to provide enhanced functionality for the device. Companies that manufacture video and sound cards regularly supply driver updates to provide compatibility with new games and other software.

Be aware, however, that the latest drivers aren't always the best. Depending on your entire set of hardware and what you are using your computer for, you may find that older drivers work better for your needs. If you are trying to run a particular piece of multimedia software or a particular game, you may have to experiment with several different drivers to see which one gives you the best effect. If you are doing mostly word processing and e-mail, you may never need to change your drivers at all.

Device & Driver Conflicts. Devices are tricky things, and every company's drivers have their own quirks. Far too often a driver that enhances one device will cause another device to stop working entirely or to fail irregularly and without notice. If two devices, for example, want to use a certain Windows file occasionally but work best with different versions of the file, then installing the second driver may cause the first to stop functioning.

This kind of conflict may not even show up in your Device Manager and can only be resolved by intuition and consultation with the companies that made the devices. Trying different driver versions may help in this case.

In many cases, however, a device conflict will show up clearly in your device manager. Devices that are working properly will simply show an icon. Devices that are present but have conflicts will show icons of a big yellow exclamation point. Any time you see an icon with an exclamation point or a question mark beside it, you have a problem. These devices are not functioning as they should.

If you double-click the device icon, the General tab will tell you that the device is not functioning. There are many reasons why a device will not work, most of them having to do with system resources. The Resources tab in the device information window will tell you which resources are in conflict (usually from two devices trying to use the same area of system memory or the same interrupt address). The Windows Help files contain good information for resolving resource conflicts.

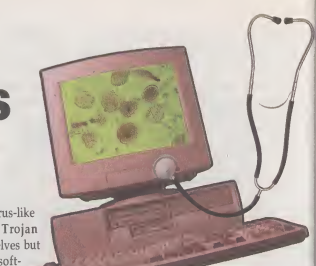
If your device is not working properly but there are no resource conflicts, then you may have a driver problem or a defective device. Try reinstalling your drivers or contacting your manufacturer for more information. You can also try disabling your devices one at a time (by checking the appropriate box on the General tab) to see if you can determine which devices are in conflict.

For video, where you have to have some functionality to work on the computer at all, try switching to one of Windows generic drivers and see if that helps the problem. LS

by Jennifer Powell

How To . . .

Check PCs & Files For Viruses



As everyone knows, the upside to the Internet is the rapid distribution of news and information. The downside is the rapid distribution of rumors, hoaxes, and, yes, viruses. Contagion is a much greater threat now that bytes travel mainly by the Internet, not diskettes carried around by "sneaker-net."

What Is A Virus? As you probably know, a virus is a small software program created to enter your PC, infect your files, and spread itself surreptitiously. Viruses come in many forms. Some replace the boot code on your hard drive, causing you to run the virus whenever you start the machine. Some replace or attach themselves to executable programs in your operating system. Some attach themselves to Microsoft Word or Excel templates and launch whenever you open a document.

What You Need To Know

Benefits
Prevent loss of data or use of a PC

Tools
Virus-checking software or access to a virus-checking Web site

Time
45 to 60 minutes to install program, scan a system, create emergency diskettes, and set up a maintenance schedule

Skill Level
Intermediate

Cost
Free (online site) to $39.95 (software package)

You also face danger from virus-like parasites such as **worms** and **Trojan Horses**. Worms replicate themselves but don't necessarily infect other software. Recent examples include Melissa and LoveLetter, which traveled quickly throughout the computing community. Trojan Horses seem innocuous but, as the name implies, carry a hidden menace. A typical Trojan Horse may exploit a programming "hole" to let remote users access your system.

These days, the most common means of infection is through an e-mail attachment you open or run. A virus also can come as part of a file you download from a Web site. Of course, it's still possible to "catch" a bug from a diskette someone gives you, and now writeable CDs pose the same threat.

In all likelihood, you won't know you have a virus until it strikes in the form of anything from a harmless message to deletion of all your data. But stay alert for the following warning signs of infection:

- Unusual displays, sounds, or disk activity
- Files that are missing or have altered dates or sizes
- Programs or files that don't work properly or are corrupted
- Unexplained lockups, crashes, or loss of memory

Unfortunately, most computers experience random glitches and freezes, so these signs are far from reliable.

Clearly you can and should protect yourself from viral attack. Among the obvious steps to take are:

- Don't open e-mail attachments from unknown sources.
- Don't download files from suspicious or untrustworthy Web sites.
- Don't follow a message that promises you something free.
- If you notice an unsolicited file on your drive, delete it.

Of course, you should back up your data regularly to safeguard it. Better yet, do multiple backups in case the most recent ones get infected. If you have a tape drive or other means of mass storage, do a system backup also.

Contaminated. If you believe you have a virus, all isn't lost. Quarantine your machine immediately. Don't send e-mail to everyone you know, warning them you've been infected; you may convey the bug to them yourself. Save whatever you're doing before it vanishes.

Your best defenses are virus-checking programs, also known as virus-scanning, virus-protection, or antivirus software. The leading packages are Symantec's Norton AntiVirus (http://www.symantec.com) and McAfee VirusScan (http://www.mcafee.com). You can download full versions of these programs for a fee or free demo versions limited to 30 days of use. Demos are also available from popular download sites such as CNET (http://www.cnet.com). Download sites offer an array of other antivirus products, including free or low-cost shareware. These utilities may not be as comprehensive as market leaders Norton or McAfee, but most will do the job. To decide which software to try, look for a large number of downloads, user recommendations, or an "editor's pick" designation.

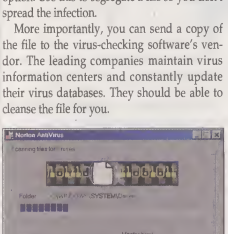
If you've purchased a computer recently, check the programs that came with it. Many vendors now load antivirus software as a standard tool or include it as an extra on a CD-ROM.

Once you install a virus checker, you have several alternatives. Typically you choose which items to scan for viruses: a file, folder, diskette, or hard drive. If you're in a hurry,

you can test just the file you doubt, but since a virus can migrate from one file to another, you probably should check your entire hard drive.

Select the hard drive under the antivirus program's "Scan for Virus" option (or similarly named option), and the software begins examining each file on your drive. If it finds an infected file, it asks what you want to do with it. You can leave it alone, mark it for later study, or try to disinfect it. Unless you have some reason to preserve the virus temporarily (perhaps to report it to someone), let the program handle it. Generally the virus checker has no trouble eliminating a virus. If it can't get rid of it, the checker may give you a quarantine option. Use this to segregate a file so you don't spread the infection.

More importantly, you can send a copy of the file to the virus-checking software's vendor. The leading companies maintain virus information centers and constantly update their virus databases. They should be able to cleanse the file for you.

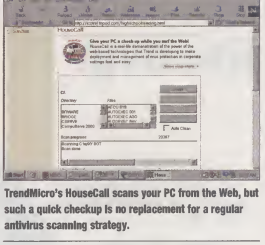


Leading software such as Norton AntiVirus scans drives and reports on the infections found.

Don't forget to test any backup diskettes, Zip disks, or CDs you've written to recently (at least since the suspicious behavior began). If you've sent an infected file to other people, or you recognize the bug as an e-mail hazard, notify your correspondents of the problem, after you're sure your system is clean.

Better Safe Than Sorry. Don't wait until you're "sick" to give your PC a virus checkup. With 15 of every 1,000 PCs becoming infected every month, you're bound to receive a virus eventually. An ounce of prevention has never been worth more. When you load a virus checker, it probably will offer several choices for the kind of protection you want:

- Scan for viruses constantly. In this case the virus checker stays in memory and scrutinizes activities such as reading or writing files. This provides the greatest level of protection, but the virus checker will slow your processing and may conflict with other software.
- Scan for viruses during startup or shutdown. The virus checker examines the system when you begin or end a session but otherwise is dormant. This offers a reasonable defense without interfering with your work.
- Scan for viruses when reading e-mail or downloading files. Because Internet operations are a primary source of infection, it's probably a good idea to activate these functions.
- Scan for viruses when reading a diskette or CD. If you receive many files by these means, you should activate these functions as well. But if you primarily work alone and read your own disks, these scans will only hinder you.



TrendMicro's HouseCall scans your PC from the Web, but such a quick checkup is no replacement for a regular antivirus scanning strategy.

Being Current. A critical point in your virus defense is the need to update antivirus software frequently. Computer scofflaws constantly release new viruses in an attempt to beat the system. An old virus checker can't detect many of these newcomers because the bugs don't match the checker's data. Without an update, a virus checker is almost useless and may be worse than useless if it lulls you into a false sense of security.

Most antivirus vendors regularly analyze new viruses, develop remedies, and add them to their databases of virus definitions. Symantec and McAfee offer updated virus databases free to their customers for the first year and charge $4 or $5 per year for updates after that. It's up to you to go obtain the updates, usually over the Internet. They won't appear magically on your PC just because you use the antivirus program.

Fortunately, many virus checkers have scheduling functions that let you schedule both a scan of your whole system and an update of your virus definitions. The update will take a few minutes, while the scan may require 15 to 30 minutes or more. Doing them every week or so is probably enough. To minimize the interference with your work, schedule them when your computer is on but you're not using it (during lunch or at night).

Because some viruses run when you turn on the PC's power, a bug can keep you from using your PC at all. To avoid this, some programs create an emergency diskette or diskettes for you. Norton calls them Rescue Disks. These diskettes have the portion of the operating system—untainted by infection—that boots the machine. They also have a copy of the antivirus utility so you can disinfect your system from the diskette. Making these disks is a smart move, even if it takes a little time. You'll also need to update them periodically with the latest virus data.

Online Aid. If you want to test a computer quickly but don't have antivirus software, you can get a checkup from a Web site such as TrendMicro's HouseCall at http://housecall.antivirus.com/pc_housecall. HouseCall spends several minutes looking for your system's components and then presents a list of them. Mark the items you want HouseCall to examine, then click Scan.

The virus check takes about 15 minutes, and HouseCall reports whether any of your files are infected. It also gives you an option to AutoClean viruses and bookmark the page so you can use it again.

The key thing to remember is that HouseCall offers only a snapshot of your PC's health. It won't tell you if you get a virus after the "house call" is over. Though it may help in a pinch, it's not a substitute for software that inspects your system on an ongoing basis. LS

by Robert Schmidt

How To . . .

Protect & Recover Your Data

One advantage to the days when information was either recorded by hand or typed on typewriters was that information was always available, as long as there wasn't a fire, flood, or other natural disaster. Although PCs have made information easier to access and more organized, they've also introduced an element of risk. After all, computers can crash and data can be lost forever for what appears to be no rational reason at all.

The best way to avoid becoming a victim of data loss is to prevent it from happening in the first place. Fortunately, there are several steps you can take to protect yourself and your PC. Following these steps will help ensure that your important data doesn't become history.

What You Need To Know

Benefits
Simple maintenance and prevention can help keep your computer healthy and prevent you from losing valuable data in a crash

Tools
Surge protector, uninterruptible power supply, antivirus software, storage medium for backups, and a disk utility program

Time
10 minutes to 2 hours

Easy to Intermediate

Skill Level
Easy to Intermediate

$$$

Cost
Surge protectors, $20 to $50; UPS, $100 to $300; antivirus software, free to $50; backup storage devices, free to $200; utility programs, free to $100

Protect Your Power. A common cause of PC problems lies in the power supply because power surges can mean big trouble for PC components. One way to protect your system is to place a surge protector between your electrical source and your PC. A surge protector will dissipate extra voltage (usually caused by lightning or other electrical spikes) before it can be passed along to your machine.

Even more common than power surges are brownouts, which are those unregulated electrical ups and downs that get through your surge protector. Because your surge protector can't offer enough protection here, you should consider purchasing a **UPS** (uninterruptible power supply). A UPS is a generator that connects the PC to the power supply that provides backup power for your PC in case of a blackout, brownout, or power surge. A UPS contains a battery and provides power for a short time, usually long enough for the original power source to be restored or for you to save your work to your hard drive and shut down the system safely.

The size of the UPS is primarily dictated by the size of its battery. In addition, most newer UPSes include a feature that will properly shut down your PC in the event that both its power sources fail, allowing you to avoid possible operating system problems that can be caused by a sudden loss of power.

Although UPS devices were once expensive, you can now pick one up quite cheaply. APC's Back-UPS Office, for example, retails for about $125 while its BP500UC retails for $138 (http://www.apcc.com).

And although most people never even think of it, another good way to protect your PC from power surges is to simply unplug it during a storm. Phone lines are also susceptible to surges, so if you have one plugged into your PC, consider placing a surge protector there, as well.

Shut Down Properly. When DOS ruled, it didn't really matter how you chose to shut down your computer. But today, things have changed. When you're running a Windows operating system, shutting down properly is important because Windows creates temporary files that need to be closed before you turn off your machine. If you were to simply pull the plug, those files would be left in limbo. When those files are left hanging, they may become corrupted or may not work properly the next time you try to open or launch an application.

The proper method for shutting down your computer is to click the Start button and select the Shutdown option. Another window will pop up in the center of the screen that gives you the option to shutdown or to restart your computer. Select Shutdown, and Windows takes care of the rest

Install Anltvirus Software. Computer viruses can do a lot of damage to your hard drive and data. The good news is they are fairly easy to prevent. There are many programs available that are designed to check your system for viruses, scan incoming files, and warn you before any infected files are allowed in.

If you don't have virus-protection software, find a good program, such as Norton AntiVirus ($39.95; http://www.symantec.com) or McAfee VirusScan ($29.95; http://

www.mcafee.com), and use it to scan your hard drive. The software should identify any files that have been infected by a virus and offer you the option to repair the file.

The No. 1 recommendation for protecting yourself against viruses is to be careful when you download files, particularly e-mail attachments from people you don't know. Files with an .EXE (executable) or .VBS (Visual Basic) extension are particularly dangerous, but most antivirus software can be configured to scan e-mail attachments. If your software allows this, take advantage of it.

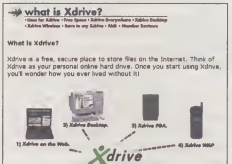
JavaScript and ActiveX capabilities associated with HTML (Hypertext Markup Language) formatting and embedded pictures also can be dangerous because they could allow e-mail programs to run destructive code on your PC. Microsoft has now established security settings for Internet Explorer 4 and 5 that apply to JavaScript and ActiveX content. To take advantage of them, you'll have to reconfigure your IE Security Zone settings. Click Start, select Settings, click Control Panel, and then double-click Internet Options.

In the Internet Options window, click the Security tab, select the Internet zone, and click the Custom Level button. Next, change the setting for each of the following options from Enable to Disable or Prompt: Script ActiveX Control Marked Safe For Scripting, Run ActiveX Control And Plug-ins, and Active Scripting and Scripting Of Java Applets.

Because new viruses pop up all the time, it's also very important to keep your antivirus software current. Check your antivirus software manufacturer's Web site regularly for updates.

Disable File Sharing. Unfortunately, Windows was not made with the highest levels of security in mind. As such, it often leaves your PC open to intrusions, especially if you are using an "always-on" Internet connection, such as DSL (Digital Subscriber Line) or cable modem connection. To protect yourself, you'll need to disable file sharing while you're online. To do so, click Start, select Settings, click Control Panel, and double-click Network. Next, click the Configuration tab, and then click the File And Print Sharing button. Make sure the box next to I Want To Be Able To Give Others Access To My Files is blank. Click OK.

Back It Up. Once you've determined all the files on your system are virus-free, you should back up your important system and data files. That way, if a virus attacks, another disaster strikes, or your PC crashes completely, having a backup can save you.


what is Xdrive?
What Is Xdrive?
Xdrive is a free, secure place to store files on the Internet. Think of Xdrive as your personal online hard drive. Once you start using Xdrive, you'll wonder how you ever lived without it!
1) Xdrive on the Web.
2) Xdrive Desktop.
3) Xdrive PDA.
4) Xdrive WAP
Xdrive
4 ways to Xdrive.
Xdrive Everywhere
Xdrive Everywhere - You can use your Xdrive from any desktop computer and web browser. Did you know that you can also access your Xdrive from any web-enabled device? From PDA to cell phone, Xdrive is right at your fingertips. Find out more

Online storage Web sites, such as Xdrive, keep your data safely offsite.

One way to do a system backup is to purchase and install a tape backup system, but there are simpler (and cheaper) approaches, as well. For example, you can buy the parallel port Iomega Zip 100MB (megabyte) drive for less than $100, and the 100MB disks cost about $10 a piece. If you need more room, Iomega also offers 250MB versions that will cost you about $70 more. You can learn more about the Zip drive at Iomega's Web site (http://www.iomega.com).

In addition, several companies now provide space on the Web for personal file storage, as well as the tools you'll need to transfer the files to and from your computer. The best part is that these services are very cheap. For example, Xdrive (http://www.xdrive.com) offers up to 100MB of storage for free, and Connected Network Backup (http://www.connected.com) offers unlimited storage for $14.95 a month. Connected also installs an application that will automatically initiate regular backups, which may be the best incentive of all.

To best protect yourself, you should do a backup at least monthly. When you do so, be sure to backup your Registry as well. Click Start, select Run, type regedit in the Open field, and Click OK. In the Registry Editor window, open the Registry menu, select Export Registry File, select a drive, and give the file a name.

One way to do a system backup is to purchase and install a tape backup system, but there are simpler (and cheaper) approaches, as well.

Use Disk Utilities. Disk utility software is great for maintaining the health of your PC and recovering data if it becomes corrupted or lost. Installing a disk utility program will allow you to defragment and optimize your hard drive and check it for errors. When you do so, watch for bad clusters (groups of disk sectors treated as one entity by the operating system or disk controller). If the number of bad clusters grows, a crash may be on the horizon.

If you do lose data in a crash, a disk utility also can help you find it and move it to a safe place if possible. A few popular disk utilities are PowerQuest's Lost & Found ($69.95; http://www.powerquest.com) and Ontrack's EasyRecovery ($89; http://www.ontrack.com). Both products work from DOS and require you to boot from a diskette. EasyRecovery has the added bonus of providing links to online technical support and online data recovery services, where technicians attempt to recover your data through a live Internet connection.

Just listening for and getting used to the sounds your hard drive makes can help prepare you for problems. If something sounds different then normal one day, take it as a warning and make a fresh backup of your data just in case. Also, be sure to keep your computer in a cool environment because overheating of the components can lead to crashes.

Finally, if you get error messages, don't ignore them. Although they may not make sense to you, they will to the technician you ask to help fix the problem. Writing these messages down word for word can help locate the problem faster and save you money. LS

by Justine K. Brown

How To . . .

Troubleshoot Backups

You've heard one too many horror stories about people whose systems crashed, leaving them high and dry with nary a backup in sight. So, with a storage device in place and backup software installed, you're ready to protect yourself against the unthinkable. The problem is that while there's plenty of information about the disasters that necessitate regular backups, there's relatively little about the disasters that can occur during a backup.

Choosing the wrong type of backup to perform is the first thing that could potentially mar an otherwise perfect plan. The solution is in understanding the differences among various backups and then creating and executing a backup plan the suits your computing needs.

The **full backup** copies every file, directory, or drive you select, regardless of any previous backup. While the full backup is the best in the event of a system failure, it is also the most time-consuming. Your very first backup should be a full backup, and then you should run full backups periodically thereafter. The more data you have and the more frequently you change it, the more often you should perform a full backup.

Incremental backups are much faster than full backups because they only record file changes made since the last backup (no matter what kind of backup that was). The disadvantage of incremental backups is in the restoration. For example, you could perform a full backup at the beginning of the month and then daily incremental backups thereafter. But if a failure occurs on the last day of the month, you'll need to restore from the full backup first, and then from each of the 30 incremental backups.

The longer you wait between full backups, the more individual sets of data you have to keep track of, and if you lose even one incremental backup, your system restoration will be flawed.

The **differential backup** is a compromise between using full backups exclusively and using full backups along with regular incremental backups. The distinction is a differential backup records all changes since your last *full* backup. Thus, you need to keep only two sets of data on hand: your full backup and your latest differential backup. The only disadvantage is that, depending on your volume of changes, the differential backup may soon become quite lengthy.

Rotation. If you back up data onto tapes, disks, or diskettes of any sort, you should consider rotating them so that you do not use the same one for each backup. Neither tapes nor diskettes are 100% reliable. First of all, they physically wear out over time, and rotation among several of them helps them last longer. Additionally and more importantly, corrupt data and corrupt programs may go undetected on your computer for a long time. If you use the same disk, diskette, or tape for all your backups, you'll probably back up the error onto that medium by the time you realize there is a problem.

Interruption. As frustrating as it might be, it is possible that your computer may lock up or suffer a power outage in the middle of your system backup. This would, of course, interrupt the backup and cause it to fail. Although most backup programs have no trouble with pausing the backup momentarily while you insert a second diskette, they don't care for other interruptions. Should your backup fail before finishing, you will need to restart the process.

Disaster Recovery Diskette. One mistake users frequently make is assuming that they can get by without making a disaster recovery diskette. This special diskette allows you to restart your computer and let the backup software immediately start restoring system data from your backup tape, disk, or diskette, even in the absence of your operating system.

Most backup software, such as Veritas Backup Exec Desktop ($79, 888/732-2021, 650/335-8000; http://www.veritas.com/us/products/bedesktop45) and NovaBACKUP from NovaStor ($59.95, 805/579-6700; http://www.novastor.com), can create a self-booting disaster recovery diskette. While the backup utility that accompanies Windows 98 is free, it cannot create a recovery diskette.

Restoration. Just because you have a set of system backups sitting on your shelf doesn't mean that you are guaranteed a perfect data restoration. It is conceivable that all or part of your backup may be faulty. If your backup software offers you the option to compare what's been recorded with the original data, you are probably safe. However, it never hurts to occasionally set aside a few files and attempt to restore them from a backup. One thing is certain: The greatest backup-related mistake you can make is not backing up your data at all. LS

by Hannah Henry

What You Need To Know

Benefits
Properly executed backups protect you in the event of system failure

Tools
Backup software, storage device and media

Time
Depends on the amount of data you need to back up, as well as the speed and size of your storage device and media

Skill Level
Easy

Cost
$50 to $80 for backup software, varying prices for storage device and media

How To . . .

Solve Common Causes Of Crashes & Reboots

You may be in for a bad day when you see the ominous words, Illegal Operation or Fatal Error, silently staring back at you from your computer screen. And the day may get worse when your system crashes, and you see nothing but a blue screen (the Blue Screen of Death). Before we go any further, know this: computers crash. If you have never experienced a crash, consider yourself lucky because the odds are not in your favor. While crashes are potentially disastrous, they're not fates worse than death. Rarely does it happen that your computer fails beyond the point of resurrection.

What You Need To Know

Benefits
Learn common causes of reboots and crashes and how to avoid them.

Tools
May require special software and backup storage media, such as a tape or Zip drive

Time
Varies; 30 to 60 minutes is average

Skill Level
Intermediate

Cost
Varies; $40 to $100 for crash protection software; $100 or more for a storage device (Zip drive, CD-RW, etc.)

Common Causes.

Knowing in advance what may cause your system to fail and what to do in the event that it does will save you from many sleepless nights. This article addresses some common causes of crashes in Windows 98 and gives some steps you can take to get your system running smoothly again.

Illegal Operations. One common error message you'll encounter is the scary-sounding Illegal Operation. When an illegal operation happens, you'll see a message stating This Program Has Performed An Illegal Operation And Will Shut Be Down. If The Problem Persists Contact The Program Vendor. An illegal operation, ominous as it sounds, can usually be taken care of quickly, but ignoring the problem tends to make it worse. It may even pave the way to a full-scale crash. If you receive this message, simply locate the offending file and replace it.

When you receive an error message of this kind, you'll also see two tabs: OK and Details. Click the tab marked Details for clues as to what caused the error. For instance, if Details displays the following message: Winword.exe [program name] Caused An Invalid Page Fault In X [module name] at X [address], you have all of the information you'll need to find the offensive file. Write down the name of the module and its address and click Close. The program will then shut down. Next, close all other programs you have running and reboot your computer. After rebooting, you should scan your hard drive for errors using ScanDisk. Click Start, Programs, Accessories, System Tools, and ScanDisk. Under Type Of Test, check the radio button corresponding to either Standard (Checks Files And Folders For Errors) or Thorough (Performs Standard Test And Scans Disk Surface For Errors). Next, check the Automatically Fix Errors box and then click start. Once ScanDisk has completed testing, it reports any errors it finds. Click Close twice to exit the program

Here's a tip: When running ScanDisk, close all other programs because if you have additional programs running, they may interfere with ScanDisk. In fact, you will receive a warning if ScanDisk has to restart too many times. You will also be prompted to close all applications if a program is attempting to write to your hard drive while ScanDisk is running. For instance, if you've left Microsoft Word running, and it attempts to perform a preset Background Save, you'll get a warning to close Word.

Sometimes ScanDisk can fix a problem automatically. In most cases with illegal operations, however, you will need to find the file that caused the offense and replace it. Remember the information you wrote down earlier? We'll now use that information to find and replace the file that has become corrupted.

With the name of the foul file in hand, you'll need to reinstall a clean version from your installation CD or diskette. You can do this by inserting your disc and using the Find Files Or Folders option (Start, Find, and Find Files Or Folders) to enter the name of the file you want to replace. When you've located the file, replace it with the new file.

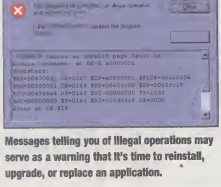
You can also locate corrupted files by using Win98's System File Checker. Go to Start, Programs, Accessories, System Tools, and System Information. Then click Tools from the Menu bar, System File Checker. Select the Scan For Altered Files radio button and then select Start. If System File Checker finds a corrupt file, you will receive a message like this:

System File Checker Identified That The Following File May Be Corrupt

File: Extract32.exe
Location: C:\WINDOWS

Next, you will be asked what you want to do. Select the Restore File option and then click OK. You will then be prompted to specify the location of the file, generally on your installation CD. Select Start, and the program will begin to check for the file. Once located, it will save the new file, overriding the corrupt one.

General Protection Faults. Another potential cause of crashes is GPF (General Protection Faults) errors. When your system becomes unstable, you may get a GPF error warning. These warnings let you know that a program has tried to access an area of memory that it does not have rights to or has tried to perform a function that it isn't supposed to perform. If you continuously receive this message while running a particular application, the problem is more than likely the application you're running. To diagnose a GPF, run ScanDisk as described earlier or use the System File Checker. If no disk errors are found, you may need to reinstall the application.



Messages telling you of Illegal operations may serve as a warning that it's time to reinstall, upgrade, or replace an application.

CTRL-ALT-DELETE. Sometimes while you are working, a program stops responding or freezes. When an application or your system freezes, you can press CTRL-ALT-DELETE to bring up the Close Program dialog box. You'll see a list of the programs that are running. If the freeze was just a temporary glitch, you won't see any error messages, but you'll be warned that if you press CTRL-ALT-DELETE again, you'll restart your computer and lose anything you haven't saved in all of the programs you have running.

If you see the message Not Responding next to one or more programs, you'll want to highlight that program and click End Task to close the application. Sometimes it may take a minute or two for the application to close, and if you are impatient, you may be tempted to press the sequence again. Don't. Again, this will shut down your system. Once the application closes, you might want to shut down, reboot, and run ScanDisk to check for errors. If your system remains frozen or unresponsive, you may have to press CTRL-ALT-DELETE and shut down. ScanDisk should run automatically when the system reboots.

Software conflicts. If you notice errors occur when you run a particular program, most likely the software application itself is the culprit. Before installing any new software, read the documentation carefully. The program you are installing, and later attempting to run, may be incompatible with another program you have installed. Conflicts between the applications may cause instability in your system that may lead to a crash. Unfortunately, you may have no choice but to uninstall the software causing the conflict in order to avoid freezes and crashes.

Improper shut downs. If you simply turn your system off rather than follow the proper shut down procedure, Win98 gives you an error message when you boot again. It then scans your hard drive for errors, which usually takes a few minutes. In most cases, it won't find any errors, but if you continue to turn off your system without following the proper shutdown procedure, you risk damaging your hard drive.

Minimize The Crash Damage.

There are a few things you can do to protect yourself from crashes and a few more that will help you recover more quickly.

Make a backup diskette. If you do crash and for some reason cannot boot to Windows, you may need to use a backup diskette to get things going. To create a bootable diskette, you'll need a blank, formatted diskette. Go to Start, Settings, Control Panel, Add/Remove Programs, and click the Startup Disk tab. Put the blank diskette in the diskette drive and click Create Disk.

Back up your hard drive. You should make it a habit of backing up your important files. You can use your diskette drive or other storage devices, such as tape backups, CD-RW (compact disc, rewriteable) drives, or Zip drives, and you can back up all of your files in Win98 using a program called Backup. Go to Start, Programs, Accessories, System Tools, and click Backup. Select the Create A New Backup Job radio button and click OK. The Backup Wizard will walk you through the rest of the process. Select the radio button for either Back Up My Computer (Backup All Files And Folders On My Local Drives) or Back Up Selected Files, Folders, And Drives (Click Next To Select Files, Folders, And Drives. If you select the latter, you'll see the directive: Click The Check Box Next To The Items You Want To Backup. When you finish, click Next. If you have previously used Backup, you will be prompted to select the radio button for either All Selected Files or New And Changed Files. First time backer-uppers will select all files. Then click Next.

You'll then be asked Where To Back Up the files. Select a destination, such as a CD-RW drive or a Zip drive. Click Next, and in the How To Back Up box, put a check mark in either or both of the following options: Compare Original And Backup Files To Verify Data Was Successfully Backed Up and Compress The Backup Data To Save Space.

Click Next, type a name for your backup job in the Type A Name For This Backup Job field and click Start.

Backup copies the files you've designated to your storage media of choice. When finished, label your diskettes, discs, or tapes and put them in a safe place.

Dr. Watson. Dr. Watson, a Win98 utility, tracks down causes of crashes. The program logs information about the crash. It takes a snapshot of your system when a fault occurs, intercepts faults, and identifies faulty software. The Dr., in most cases, is able to diagnose the problem and offer a suggested plan of action. If you need to contact Microsoft's Technical Support for assistance, the information log can be of great help. To open Dr. Watson, go to Start, click Programs, System Tools, and System Information. From Tools on the Menu bar, select Dr. Watson, and follow the prompts.

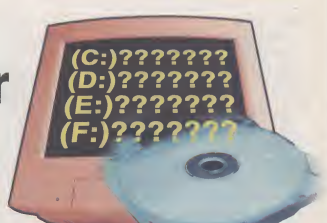
Commercial software. You can use commercial software to avoid crashes and help get your computer up and running in the event of a crash. One program is Norton's Crash-Guard by Symantec (http://www.symantec .com). It has many features including VitalSave, which protects the documents you have open when a crash occurs and guides you through recovery. CrashGuard retails for $29.95, and it's bundled in both the Standard and Professional editions of Norton's SystemWorks ($59.95 and $99.95).

If your system won't reboot or it seems unstable, you may have to reformat your hard drive and reinstall Win98 from the installation CD. Practicing preventive measures, such as routine backups, will make this a far less painful option. LS

by Myra Faye Turner

How To . . .

Set Up Drive Letter Assignments



"Argh!" That cry of agony might be coming from you if your carefully designed hierarchy of drive letters is disturbed when you install a new drive. Whenever you install a new hard drive, high-capacity removable media drive, or optical drive, that drive must be assigned a new drive letter. If you don't understand how drive letters are assigned, you can scramble your current assignments.

When you add a new hard drive or other drive to your system, it would ideally receive the next available drive letter. In many cases, though, this doesn't happen. Instead, a new drive often swallows up a previously assigned drive letter, bumping other drives up one letter or more. If you install more than one new drive, this can compound the confusing problem.

Installing a new drive changes the letters of existing drives so often because of the way your computer assigns letters to hard drives and other types of drives.

What You Need To Know

Benefits

You won't need to reinstall software to fix drive letter problems.

Tools

No tools are necessary, but you may need blank diskettes for installing some utility programs

Time

Varies; adjusting drive letters in the Device Manager takes less than 5 minutes. Copying data between old and new hard drives can take more than 1 hour. Downloading utility software can take more than 1 hour, depending upon the speed of your Internet connection and the size of the program

Skill Level

Easy to Difficult

Easy to Intermediate for drive letter resetting; Intermediate to Difficult for installing a new hard drive

Primary vs. Extended Partitions. On a typical fresh-from-the-factory computer, the physical hard drive is referred to as the C: drive. When the manufacturer prepared the PC at the factory, its hard drive was configured with a primary disk partition by either FDISK or an equivalent program. A **primary** partition can start your computer when it is formatted with the system option. Typically, the primary disk partition occupies 100% of the drive's capacity and is called C: on a single-hard drive system.

Some users buy special programs such as PowerQuest's PartitionMagic ($69.95, http://www.powerquest.com) to subdivide their single physical drive into two or more drive letters in order to store data separately from the Windows operating system or application programs. PartitionMagic can reduce the size of the primary partition, letting the rest of the disk be changed into an **extended** (non-bootable) partition. The extended partition can contain one or more logical DOS drives, which can be any size.

A typical factory configuration for a computer usually allocates 100% of the disk space to the drive labeled C: and labels the CD-ROM drive D:.

If you reduce the size of the primary partition on the same computer and create a new extended partition to contain two additional drive letters, the drive letter assignments might look like this:

Primary partition—labeled C:, occupies less than 100% of the hard drive
Extended partition—contains both drive D: (a logical DOS drive) and E: (another logical DOS drive)
CD-ROM drive—labeled F:

The "floating CD-ROM" drive is bad enough as it is, but if a second hard drive is installed, and it is not prepared correctly, the drive configuration becomes even more confusing:

Hard Drive #1
Primary partition—labeled C:, occupies less than 100% of the hard drive
Extended partition—contains two logical DOS drives labeled E: and F: (formerly labeled D: and E:)
CD-ROM drive—labeled H: (after starting out as D: and then moving to F:)

Hard Drive #2
Primary partition—labeled D:
Extended partition—contains logical DOS drive labeled G:

What happened? Before you partition an existing drive or add a new drive, you must understand how Windows assigns hard drive letters. Primary partitions receive drive letters before extended partitions. If you install a second drive, *never* set it up as a primary partition if you plan to keep both drives in your system. As the example above shows, you'll scramble the drive assignments you had previously. Instead, when you prepare the new hard drive, set up 100% of the drive as an extended partition. The result? The second dri.ve will use drive letters that follow those assigned to the first drive. If you have three or four hard drives, the same logic prevails through a setup like this:

Hard Drive #1
Primary partition—labeled C:
Extended partition—contains logical DOS drive D: and logical DOS drive E:
CD-ROM drive—labeled H:
Hard Drive #2
Extended partition—contains logical DOS drive F: and logical DOS drive G: (no primary partition)

Assignment Utilities. If the hard drive you installed is going to replace an existing drive, use the drive-copying utilities supplied on the utility diskette packaged with the drive to transfer data between from your old and new drives. If you purchased a hard drive that didn't come with a setup diskette, you can usually go to the manufacturer's Web site to download the programs needed to configure the drive and copy data from the old drive to the new drive. The table on this page lists the drive setup utility programs available from major hard drive makers.

After copying your old drive's contents to your new hard drive, you can use FDISK to remove the old drive's primary (and extended partition, if any exist) and set up the drive as a 100% extended partition with one or more drive letters for use as a secondary hard drive.

Some setup programs can automate the entire process of adding a drive, including helping you with the process of converting your old drive into a secondary drive for data only.

Optical & Removable Storage Drives. A CD-ROM or other optical drive isn't a full partner with hard drives; Windows will always assign hard drive letters first. So how can you set up a CD-ROM drive that will "stay put" in terms of drive letters?

As soon as you install a new CD-ROM, DVD (digital versatile disc), CD-RW (CD-rewriteable), or similar drive, you can easily assign it any unused drive letter. Just right-click My Computer and select Properties. Click the Device Manager tab and click the plus (+) sign next to the CD-ROM category. Select your drive and click Properties. Click the Settings tab and use the Reserved Drive Letter option to select a drive letter beyond the current letter. Any drive letter at least three or four letters above the last hard drive letter is a safe choice. Select the same letter for the Start and End drive letters, unless you have a multiple CD-changer drive. If you have a CD-ROM drive that can hold four CDs at once, you would need to specify K:-N:, for example.

If your computer is connected to a network in your office, make sure you don't use a drive letter already assigned to a network drive.

Hard drive upgrades aren't the only causes of CD-ROM drive letter changes. You also should be vigilant for the effects of installing other types of removable media drives. To control the drive letters used by your Iomega Zip or Jaz drives, as well as your CD-ROM/DVD/CD-RW drives, you should download the latest version of IomegaWare from Iomega's Web site at http://www.iomega.com IomegaWare 2.2.1 and newer versions offer the Drive Letter Manager feature on the Get Help tab of the IomegaWare program. Use Drive Letter Manager to select the drive letters you want for all of your removable media drives.

You can change the drive letter assigned to an LS-120 (SuperDisk) drive within the Windows 9x/Millennium Device Manager using a process similar to that used for CD-ROM drives.

The properties sheet for your CD-ROM, CD-RW, or DVD drive lets you reset your drive letter to any available letter of your choice.

Hard Drive Replacements. Drive letter assignments can become quite odd if you are using one of the multigigabyte drives from Iomega or Castlewood that have been touted as hard drive replacements. Earlier in this article you learned that a second hard drive prepared with a primary (bootable) partition can shift existing drive letters on both existing hard drives and CD-ROM drives. Because cartridges for Iomega's Jaz and Castlewood's ORB drives can be formatted as either bootable (primary partition) or non-bootable (extended partition), your drive letter assignments could shift depending upon how you format the cartridge.

To avoid problems, strive for consistency, especially if you also use IDE (Integrated Drive Electronics) hard drives in the same system. If you plan to use your Jaz or ORB drive as a bootable drive, always boot with it. If you plan to use it strictly for data, always prepare your cartridges with an extended partition.

If you've just installed a new drive that caused other drive letters to shift around, apply the appropriate tip before you start installing software. If you are reading this article after you've started to really use your new drive, you may be facing the problem of telling your software where to find your CD-ROM or other drive. In the bygone days of MS-DOS, changing drive letters was relatively easy, but with the advent of the Registry in Windows 95 and later Windows versions, the pointers that tell the system where to look for a CD-ROM drive for software installations, additional files, etc., are buried deeply within the Registry.

PowerQuest's PartitionMagic includes two utilities that come in handy for partitioning. MagicMover easily moves applications to another partition or drive without reinstalling them and maintains all settings. DriveMapper easily updates drive letter references after partitioning. LS

by Mark Edward Soper

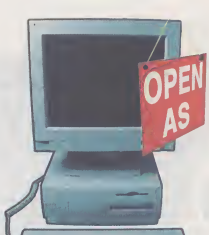
Drive Setup Utilities

Hard Drive Maker	Utility Program	Web Site
Seagate	DiscWizard*	http://www.seagate.com
Maxtor	MaxBlast	http://www.maxtor.com
Western Digital	Data Lifeguard Tools	http://www.westerndigital.com
Quantum	Ontrack Disk Manager 2000	http://www.quantum.com

** DiscWizard also includes a CD-ROM drive letter manager.*

How To . . .

Open Files Without The Program That Created Them



There are thousands of kinds of files in the world of computing. With so many file types, it's possible to receive an attachment that you can't seem to view, download a file that won't open, or buy a CD with files that either won't open or open as gibberish.

File Names & Extensions. Most files have a name that consists of two parts: the file name and the file name extension, separated by a period, such as Letter.doc or Memo.wpd. The extension is used to specify the program that created the file, such as Microsoft Word (.DOC) or WordPerfect (.WPD). In many cases, a program such as Word can open a file with a similar file format (such as WordPerfect).

What You Need To Know

Benefits
View files that won't open automatically

Tools
Third party software may be required

Time
5 to 10 minutes; longer to download a program to open files

Skill Level
Intermediate

Cost
Free for some solutions; as much as $60 to purchase software packages

Identifying Files. To view file name extensions in Windows 98, open My Computer or Windows Explorer. Select any folder, then click View, Folder Options. Click the View tab, then uncheck the Hide File Extensions For Known File Types box. Click OK and then look in the folder to view the extensions.

Win98 also displays an icon next to each file name. Ideally, the icon represents the associated program. Associated programs let you create, open, view, and modify files with a particular extension. To view which icons and extensions are associated with registered programs on your system, click the File Types tab in the Folder Options dialog box opened above, then click a file type in the Registered File Types list.

When A File Won't Open. When a file won't open or opens as nonsense characters, look at the file name extension. To see a list of thousands of file name extensions and their associated programs in alphabetical order, visit http://www.crosswinds.net/sanmarino/~jom/filex/extensio.htm.

If you have a similar program, click the file once in My Computer or Windows Explorer. Next, hold down the SHIFT key, then right-click the selected file. In the shortcut menu, choose Open With. In the Open With dialog box, choose the program you want to try. Be sure to uncheck the Always Use This Program To Open This Type Of File checkbox. The program you choose may have a conversion utility that was not included in a typical installation. If so, you will usually be prompted to install the utility using the original program CD.

Another place you can look to see if you can open a different file type using a program on your system is the Open dialog box. Open the program, click the appropriate place to Open a file (usually in the File Menu), then look for a Files of Type or similar list. If your extension is in the list, click it, then try to open the file.

A last resort is to use Notepad to open the file. In some cases, you may see enough text to figure out what the file contains.

Viewing A File That Won't Open. Win98 has several options for viewing unassociated file types. If any of the following Windows Components are not currently available on your system, you may have to install them from your Win98 CD using Add/Remove Programs/Windows Setup within the Control Panel.

Quick View. Open My Computer or Windows Explorer and right-click the file to view. Click Quick View in the shortcut menu. Quick View displays a variety of text, spreadsheet, graphic, and database file types. You can also view technical information for some program files (.EXE[executable]), including which .DLL (dynamic-link library) files the program uses.

Media Player. In the Start Menu, click Programs, Accessories, Entertainment, then Media Player. Click File, Open. Look in the Files of Type drop-down list to see what audio files you can open with this accessory. If none are listed, select the file and try to open it.

Imaging. In the Start Menu, click Programs, Accessories, Imaging. Use this accessory to view and manipulate images. Click File, Open, then look in the Files of Type drop down list to see what image files you can open. LS

by Anne Shevrin

How To . . .

Add Accessibility Options To PCs

Imagine that you only have one finger to type with. When you need to perform keystroke combinations such as CTRL-C, this simple task suddenly becomes more challenging because it requires two fingers. Windows offers accessibility options that can help in situations like this. These tools make it easier for a user with a disability to use the computer and are built into Windows so you won't need to install special software.

The accessibility options include features such as StickyKeys, which let you press a key such as CTRL and have it remain active until you press another key. This lets you "press" CTRL-C using only one finger, for example. There are, of course, many other options, including sound and visual options, as you'll see when you set up the Accessibility options.

To install the Accessibility options, you will run the Accessibility Wizard. Don't worry if you think you've made a mistake as you walk through the options in the wizard; the changes you make are easily undone or altered later on.

Choose Start, Programs, Accessories, Accessibility, Accessibility Wizard. If the Accessibility Wizard isn't listed, you'll need to install it. To do this, choose Start, Settings, Control Panel, Add/Remove Programs and click the Windows Setup tab. In the Components list, locate Accessibility, enable its checkbox, and click OK. Follow the instructions onscreen (which will probably require you to place your original Windows 98 CD in the drive) to install the options. When you're done, repeat the first step of navigating through the Start menu to the Accessibility Wizard.

What You Need To Know

Benefits
Easier control of the PC for users who have difficulty seeing the screen, hearing sounds, or using the keyboard or mouse effectively.

Time
10 to 15 minutes

Skill Level
Easy to Intermediate

Working With The Wizard. The first step of the wizard lets you change the screen magnification. Choose from Normal (the default), Large text, or the Magnifier option by clicking the option and then choosing Next.

You'll now select the size of text to be used on the screen. The first option is to change the font size for the title bars, menus, and other Windows features; note that this doesn't alter the size of the text in the windows themselves. The other options let you switch to a lower screen resolution (you'll see less on the screen, but the size of everything will be correspondingly larger) and use the Microsoft Magnifier, which is a floating window that displays a magnification of part of the screen. Choose any or all of these options by enabling the checkboxes, or disable them if you don't want any changes to the current screen display. Click Next to continue.

The next step lets you tell the Wizard about your disability so it can offer you appropriate options. Choose the option or options that best describe your disability and click Next to continue. The options let you make changes to assist you if you have difficulty hearing or seeing or if you find it difficult to use the keyboard or mouse. Depending on the type of disability you have, you'll be able to make choices from various accessibility options that will make it much easier for you to use the computer. Walk through the screens making your choices and click Next to continue to the subsequent screen.

In most cases, the current or default setting will be preselected so you can leave them as is if you don't want to change them. You should note, too, that where the alternatives are presented as checkboxes, you can select any or all or none of them depending on your preferences. When the alternatives are presented as option buttons, you must choose only one.

When you finish, you'll see a list of changes made to your system. The settings you've chosen will now be installed and functional, so go ahead and test them out.

If you need to make changes to any setting except the Magnifier, choose Start, Settings, Control Panel, Accessibility Options. To start and manage the Magnifier, choose Start, Programs, Accessories, Accessibility, Magnifier.

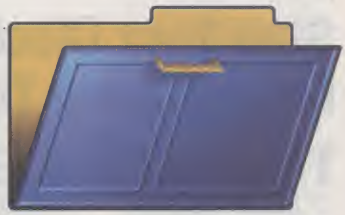
You will find information about the various accessibility options by looking up Accessibility in Windows Help. Choose Start, Help. Click the Contents tab and Using Accessibility Features. Here you will find details about the features themselves, links for setting them up, and lists of hotkeys for using the Magnifier and Accessibility features. In addition, if you're sharing a computer with others and not everyone needs the same features installed, look for the instructions that cover setting up the computer for use by more than one person. This way, all users can have their own settings independent of everyone else.

The Microsoft Accessibility pages at http://www.microsoft.com/enable contain additional useful information about Windows Accessibility options. LS

by Helen Bradley

How To . . .

Work With File Associations



When you click a Word .DOC file, you expect it to open in Word, but all too often, files that should open in one program open in another. Worse still, this behavior can change unexpectedly. You might be in the habit of double-clicking JPEG (Joint Photographic Experts Group) files and having them open in one application, but one day you click a JPEG file, and another program opens it. The problem isn't of your making, but it can be very inconvenient and annoying. You'll be glad to know it's also quite easy to solve.

What's Going On. When you install software, the program makes an association between itself and its files. For example, Excel worksheets are .XLS files; this file extension is associated with Excel. When you double-click an .XLS file, the operating system checks the file's extension in its list of extensions and notes that this is an Excel file. It then opens both Excel and the file. Few, if any, other programs use the .XLS extension, so the system works very well for Excel files.

Problems arise more commonly with extensions such as .JPG, which designates the JPEG graphics format files that are used on the Web and don't belong exclusively to any single program. However, your PC will associate the .JPG extension with one of its programs and try to open the files with that program when you double-click them. Unfortunately, other programs you install may seize the .JPG extension as their own association. This explains why a file format that your system opened in one program for months suddenly opens in another program.

Well-designed installation programs ask whether you want to change the associations for certain file types as you're installing the software. Now that you understand the impact of the choices you make, you can make a more informed decision. Most programs, however, set up their own associations without asking first, so you'll often have to fix the problem yourself.

Solving The Problem. The simplest means of solving the problem is to open Windows Explorer and locate the file whose associated program you want to change. Hold the SHIFT key as you right-click this file to see a small menu appear. Choose Open With to see a dialog box that contains a long list of program icons and truncated names.

It should be fairly easy to locate the program you want to use to open this file. If you're unsure, look for the icon you're familiar with from your use of the program as well as a program name that sounds right. Often you'll find that this list omits company details, so Corel PhotoHouse is listed as "photohse," and Microsoft Word appears as "winword."

If you can't easily locate the program to use, click the Other button and browse your hard drive for the program file. Select the file and click Open.

When you find the program to use, select it and then enable the Always Use This Program To Open This Type Of File checkbox and click OK. The program you selected will open, and the file will appear in it. In the future, all files with this extension will open in this program when you click their file names.

Occasional Changes. You also can change associations for one time only. For example, if you have a .JPG file and you know .JPG files always open in your Web browser, you can change this behavior if you want to open a particular file in PaintShop Pro. To do this, go to Windows Explorer, hold down the SHIFT key, right-click the file name, and choose the program from the list. This time make sure the Always Use This Program To Open This Type Of File checkbox is *not* selected and click OK. The file will open in your chosen program this time only, and you will not have made any permanent change to the associations.

Of course, you can always mimic this behavior by opening the program first and then, from inside the program, opening the file to work on. This will work in any program at any time (provided the program can read files of this type), and using this method will have no effect on the associations on your computer.

Viewing Associations. If you're curious about which file belongs to which program, you can easily see the associations in Windows Explorer. To do so, open Windows Explorer; choose View, Folder Options, View tab; disable the Hide File Extensions For Known File Types checkbox; and click OK. Choose View, Details to see full details for your files, including the type of each file. In most cases, the file type will include reference to the program that is currently set to open files of that type. LS

by Helen Bradley

What You Need To Know

Benefits
Quickly fix the problem of your system opening files with the "wrong" program.

Time
A minute or two for each change required

Easy to Intermediate

Skill Level
Easy to Intermediate

How To . . .

Stop Your Clock From Losing Time

Those of you who watch your computers with a critical eye may notice you occasionally need to reset the clock in the lower right corner. A few users may even see wild time fluctuations that indicate something particularly fishy is going on.

Under Einstein's theories, the appearance of the slowing clock may be evidence that your computer is traveling relative to you at velocities approaching the speed of light. However, if your system appears to be in the same place you left it yesterday, there is probably a simpler explanation.

Times Two. That clock in the Taskbar is not your computer's only one. Actually, that is a software creation that belongs to the operating system and depends on Microsoft technology. But just like many aspects of Windows, the clock has a few flaws.

For instance, simply leaving the computer on for extended periods of time could cause it to lose several minutes or even an hour per day. Ironically, resetting the day or month may throw the time off a few seconds. And, antivirus or power-management programs can confuse the Windows clock into falling behind.

To compensate for these potentially annoying problems, the Windows clock resets itself each time you reboot your system. It picks up the time from the master hardware clock that is located inside the computer. This quartz RTC (real-time clock) works like most clocks these days by drawing power from a small battery that is similar to what powers your wristwatch. The RTC is pretty accurate as long as the factory-installed battery is up to speed. After about three to five years, depending on your computer use, the RTC's battery begins to run down, and the clock becomes unstable.

Usually RTC problems give themselves away by repeated and extreme temporal fluctuations. A clock that seems to lose a few seconds here and there is probably a Windows clock problem. However, clocks that read months or years out of date or, even more telling, clocks that always reset themselves to midnight on Jan. 1, often indicate battery trouble.

The RTC runs off the same battery that powers a tiny bit of CMOS (complementary metal-oxide semiconductor) memory where your computer stores vital information about how to boot up and read its hard drive. If this important battery completely dies, your system may not boot at all, or you may see strange error messages about memory or disk problems. Assuming your computer still works except for the clock, you'll want to replace the battery right away or pay someone else to do it before the juice runs down and your CMOS goes senile.

Assault On The Battery. If you decide your battery is a likely culprit, be sure to write down your CMOS settings before removing the power. Your system's owners manual or an on-screen message should let you know which key combination to press during startup to enter the CMOS settings program. Write down all the numbers you find in case they don't come back on their own. The wrong settings could cause hard drive data to be lost for good.

Next, back up your important system files and documents just in case the worst happens. Of course, it's always a good idea to make regular backups a habit. Look in the manual that came with your machine to see if the manufacturer offers any special instructions. After that, open up the case by removing the necessary screws or, with some systems, you can simply slide off the cover.

Most batteries are located on the motherboard near the power supply. Often, the battery will look like a small blue or white drum on its side connected at either end to the motherboard. A few look more like watch batteries or even the typical cylindrical battery. Some systems have batteries soldered down on the motherboard, which means you'll probably have to take a trip to a technician.

If the battery looks like something you can take out easily, consult your manual for the best way to take it out and then decide exactly what you should put back in. If the manual doesn't say which type of battery the computer uses, you'll have to look at the battery yourself and write down any numbers you see. A good battery store either online (such as Battery Express at http://www.batteryexpress.com) or in your hometown should carry most sizes, but an older type may be difficult to find.

With a fresh battery in place, your $1,000 computer should once again be able to tell time almost as well as a $5 wristwatch. LS

by Alan Phelps

What You Need To Know

Benefits
Keep your computer on time and get an early warning regarding potentially troublesome battery problems.

Tools
Screwdriver

Time
Up to 30 minutes

Skill Level
Easy

Cost
$5 to $10

How To . . .

Add System Sounds

Many users take the time to pick out custom wallpaper and a special screen saver to make their computer their own special device. While you may not know it, you can also change the sounds that your computer uses. The process is so quick and easy that you can frequently switch between several different sets of sounds.

Windows has a list of events, such as maximizing a window or a program error, for which it can play a sound. Other programs can add their own events, such as receiving mail or spotting a virus. Most users do not want their computer beeping and chiming all the time so, by default, only a few of these events have a sound associated with them.

Windows plays a sound by playing a WAV (sound) file. When one of these events occurs, Windows checks to see if a WAV file has been associated with it and, if so, it plays it. Windows comes with a number of WAV files for just this purpose.

However, the really neat thing about Windows sound is you can download WAV files and use them, so you can customize your system sound. If you search the Internet, you will find literally millions of WAV files you can download and use. You can find everything from Star Trek phasers firing to cartoon characters speaking to motors roaring and everything in between.

What You Need To Know

Benefits
Add sounds to system events

Tools
Microphone (optional)

Time
5 minutes or less

Skill Level
Easy

Record Your Own. Not only can you download WAV files off the Internet but you can also record your own. All you need is a microphone that plugs into your sound card. To record, just click the Start button; select Programs, Accessories; and then choose Multimedia in Windows 95 or Entertainment in Windows 98. Choose Sound Recorder.

This starts the Sound Recorder. Click the Record button to begin and use the microphone to capture your sound. Once you are finished, click the Stop button and then save the sound as a WAV file. If there is a special sound you want to record that you cannot get to your computer, record it to a cassette recorder and then use the recorder to replay the sound into the microphone. Using this approach, you can capture sound from radio or television or from outside.

Once you have downloaded or created the sounds, you simply attach them to specific events within Windows. To do this, use the Sounds applet in the Control Panel. To start it, click Start, Settings, Control Panel and double-click Sounds.

This brings up the Sounds Properties dialog box. At the bottom of the dialog box is the name of the current sound scheme you are using. Windows comes with six ready-made schemes: Windows Default, Jungle, Musica, Robotz, Utopia, and No Sounds. You can save as many more as you like. Switching between schemes is as easy as clicking the drop-down button and selecting a new scheme from the list. This makes it quick and easy to switch schemes, say from a noisy one during the day to no sound at night.

In the top part of the dialog box is the list of events. You scroll through this list to highlight the event for which you want to change the sound. The speaker symbol shows you which events currently have a sound assigned. Once you highlight an event, the middle of the dialog box shows the WAV file that currently plays for that event. Just click the Browse button to search for a new WAV file to use. Once you find a potential file, the button to the right of the Preview box lets you listen to it.

You want to use short sounds. Longer sound clips can interrupt functions or keep you from using the computer right away. Also, a sound that sounded funny at first will quickly become annoying as you hear it dozens of times a day, so pick your sounds carefully or plan on changing them frequently.

Once you have assigned sounds to those events you want to announce themselves, you can click the Save As button to save the current configuration as a named scheme so you can easily switch back to it in the future. Click OK and then close the Control Panel.

Troubleshooting Sounds. Here's a quick checklist for some of the most common sound-related problems and their solutions.

No WAV files. You either did not install them with Windows or erased them afterward. Rerun the Windows installation program and reinstall the sound files.

No sound. Most sound cards can only play sounds from one source, so if you are playing music, you will not hear system sounds. You also might need to take the cover off your PC and make sure the card is seated correctly.

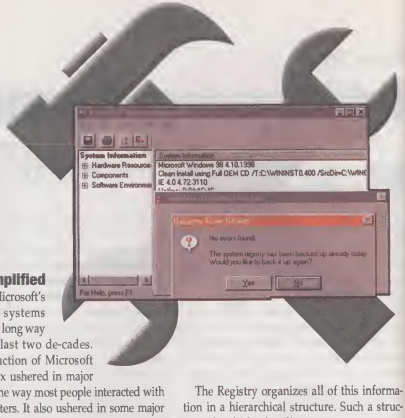
No sound for one event. Most likely, the WAV file for that event has been erased or damaged, so change the WAV file assigned to it.

Sounds too loud or too quiet. You control system sound volume by the volume setting on your speakers, not by the computer, so adjust your speakers. LS

by Ronny Richardson

How To . . .

Troubleshoot & Customize The Registry



Within your Microsoft Windows PC, a single archive of configuration information influences almost every aspect of the computer's operations. This archive is the Windows Registry, a critical but little-publicized part of millions of operating systems streaming forth from Microsoft.

From hardware, such as the mouse, to software, such as your favorite Web browser, the Registry holds the settings that make things work. Users can customize these settings to make their computers and software work better. If something goes wrong with the Registry or it becomes corrupted, your normally trusty and reliable computer can start to misbehave. That's when you'll be glad you learned how to back up and recover the Registry and your system data.

What You Need To Know

Benefits
Learn how to back up and restore your system if the Registry becomes corrupted; customize and fine-tune your system to make it work better

Tools
The Registry Editor, Registry Checker, and backup software

Time
10 to 45 minutes, depending on backup, recovery, tweaking, and customizing tasks

Skill Level
Intermediate to Difficult

In Simplified Terms.

Microsoft's operating systems have come a long way during the last two decades. The introduction of Microsoft Windows 3.x ushered in major changes in the way most people interacted with their computers. It also ushered in some major system configuration headaches. Back in those days, the majority of system configuration information was kept in a few text files that typically had an .INI file extension. Any software product could modify these configuration files as part of the installation process. As a result, the primary files Win.ini and System.ini became bloated, difficult to understand, and frequently inconsistent. End users typically saved a copy of their INI (initialization) files when the system was working and restored them when trouble struck. This unconstrained access to the system configuration led to vexing problems and countless long, tedious technical support calls.

Fortunately, those days are in the past. The Windows Registry is Microsoft's solution to this problem; it was designed to replace the INI files and be the single, central storehouse for your computer's configuration information. Microsoft has been successful enforcing the use of the Registry for the vast majority of system and software developers. As a result, if you want to access your system's configuration information, the Registry is the place to go. The configuration information is vast. Examples include what screen resolution you are currently using, what your wallpaper looks like, how long before your screen saver starts up, what the most recently used files are in Excel, which network adapters are installed in your system, as well as your Web browser's home page and your computer's network address.

The Registry organizes all of this information in a hierarchical structure. Such a structure should be familiar to computer users; the folders and files on a hard drive display in a hierarchy. And, just as you might use Windows Explorer to explore your file hierarchy, you can use the Registry Editor (referred to as Regedit.exe) to explore the Registry hierarchy. We'll cover this program in more detail shortly.

Troubleshooting Registry Problems.

First, we need to talk about diagnosing Registry problems. A significant problem with the Registry manifests itself in several ways. The most dramatic is definitely the dreaded "Blue Screen of Death" that you'll see when your system goes completely terminal. A "Blue Screen of Death" does not necessarily mean that your Registry is fatally corrupt because a physical hardware problem can cause the same result. Nevertheless, you can eliminate several of them with a timely recovery of the Registry.

Another manifestation of a Registry problem can occur while your system boots up. If you receive an error during startup stating the Registry was unable to locate something, you can be sure that some part of the Registry is inconsistent. Depending on how critical that "something" is to Windows 98, your computer may or may not be able to continue booting.

A third possibility is that after Win98 boots, you receive a dialog box letting you

know that there is an error in the Registry. At least with this type of error, you have some chance of tracking down the problem. If you can identify an application that seems to be related to the error (and the only help is the error message text), uninstalling and reinstalling that application can sometimes clean up the problem.

The final manifestation of a Registry problem is the most insidious: inconsistent and unstable behavior. Not all problems with the Registry are obliging enough to cause a dialog box to pop up and warn you about them. If your system starts to behave erratically, it might be due to a corrupt Registry. Unfortunately, it's not always easy to diagnose Registry problems; but when you can, there is a good way to try to fix them.

Win98 comes with a handy program called the Registry Checker (referred to as Scanreg.exe). There are also many third-party utilities out there that try to help you diagnose and fix Registry problems. DaveCentral (http://www.davecentral.com/Registry.html) is a Web site providing several links to Registry tools. But even if you don't have one of these utilities, you still have Scanreg.exe. This program actually runs as part of the operating system's boot process, but you can use it manually to try to diagnose Registry problems. Click Run from the Start menu, and when its window opens, type scanreg.exe and click OK. When Scanreg.exe finds errors, it will report them back to you.

You can also use a "/fix" option when you reboot from DOS. To do this, restart your computer in MS-DOS mode by using an option on the Shut Down dialog box. Once your computer restarts in MS-DOS mode, simply type scanreg.exe /fix at the DOS prompt. According to Microsoft's documentation, using Scanreg.exe with the "/fix" option will repair any damaged Registry portions and "optimize it by rebuilding it without unused space."

Unfortunately, Scanreg.exe is limited to fixing "damaged portions" of the Registry. What happens when incorrect or inconsistent information is stored in an undamaged portion of the Registry? When this is the case, and again it's difficult to diagnose, you may have to fall back to your ultimate line of defense: backup and recovery.

Be Safe & Back Up. The most effective defense against Registry problems is to understand how to back up your Registry and to make sure you actually create backups regularly. It's this simple: back up the Registry when it is good and recover when it's bad. The frequency with which you modify your system (such as when adding and removing hardware and software) influences how often you should back up the Registry. If changes are infrequent, you can go weeks (and even months) between backups and still be fairly safe.

When you are deciding when to make backups, keep in mind that the settings and configuration data that is in place at the time you make a backup will be restored if you are forced to recover from that backup. So, if you like how your system is configured, be sure to have a backup that can put it back into that state. It is always a good idea to make a backup before attempting significant system modifications or manually tweaking the Registry.

If you value the information stored on your computer, it is strongly recommended that you seek out one of the many high-quality backup utilities that are available for Windows PCs. Be sure that your utility backs up the Registry as well as your files. For more information about backup utilities, see "How To . . . Recover From System Lockup" in this issue. In addition, WinFiles.com (http://winfiles.cnet.com/apps/98/backup.html) and Allen's WinAppsList (http://www.winappslist.com/utilities/backup_utilities1.htm) are two good locations to start searching online for a system backup tool. These utilities should make backing up and restoring the Registry quick and painless. That's an important consideration because people have a tendency to not bother with this important part of computer ownership. The easier it is to make a backup, the more likely you are to keep it up-to-date.

If your computer usage is more casual, you can back up and restore the Registry using the tools provided with Win98. You can use the Scanreg.exe program to make a complete Registry backup. To do this, restart your computer in MS-DOS mode by using an option on the Win98 Shut Down dialog box. Once your computer restarts in MS-DOS mode, simply type scanreg.exe /backup at the DOS prompt.

While browsing through the folders and files in the main window of the Registry Editor (also known as Regedit.exe), you will see something similar to the example above.

You can provide an optional file name to the command to specify what your backup will be called.

A third method that you can use to back up your Registry involves the Regedit.exe program mentioned earlier in the article. Regedit.exe has an export feature that allows you to save portions of the Registry in a text file. An import option lets you use this text file to restore the saved portion of the Registry. With Win98, you can export the entire Registry, but this method doesn't work with all versions of Windows (namely Windows NT), so the first two methods are preferable.

One final note: Seasoned system administration veterans know that it's not enough to simply make backups. It is also important to know that you can actually restore your system from the backup. Many tears are shed because of faulty backup procedures or bad media. It's a good idea to periodically perform a practice restoration.

It is also important to know that you can actually restore your system from the backup.

Recovery When Necessary. Restoration, Recovery. Aren't those comforting words? When something goes wrong in the Registry, your system will need restoration, and you can take comfort in having listened to our recommendations and having

good backups on hand. If you chose a third-party utility, simply locate your backup media and follow your software's instructions. You should have practiced the recovery already, so you should be back on track in no time.

If you are using Scanreg.exe, start or restart your Win98 computer in MS-DOS mode. When you see the DOS prompt, type scanreg.exe /restore. When you do this, you'll see a list of your available backups; choose one and press R. After you restore your Registry, you can start Win98 by typing win at the DOS prompt.

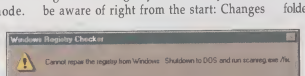
If you need to restore from a text file exported from Regedit.exe, then start the Regedit.exe program by clicking Run from the Start menu, typing regedit.exe in the field, and clicking OK. Next, select Import Registry File from the Registry menu, navigate to your Registry file, and click Open. You should see a dialog box informing you that your restoration was successful.

Customizing Options. Now it's time to move onto the lighter side of the Registry: customization. After your Registry is functioning and contains consistent configuration information, you can take advantage of its other abilities. Since the Registry is the central configuration database for your Win98 system, the opportunities it presents for customization are practically endless.

This is a good place, however, to issue some important warnings. Before making any changes to the Registry, it is important to understand that the configuration information contained in it is absolutely critical to your computer's operation. Depending on what configuration information becomes corrupted, some applications might stop working or your operating system might become unstable or even refuse to start. Because the Registry plays such a central role, it pays to be conservative when making changes, and always back up the Registry before manually changing anything. In addition, you should only change information manually when you're certain about the effects of the changes. There are typically (but not always), safer ways to customize your computer than to poke around in the Registry. Take the safe route when possible, and stay out of trouble.

With that in mind, here's how to proceed with customizing your Registry. Start the Regedit.exe program by clicking Run from the Start menu, typing regedit.exe in the field, and clicking OK. You should see the Registry Editor window appear on-screen.

There is an important aspect about working with the Registry Editor that you must be aware of right from the start: Changes



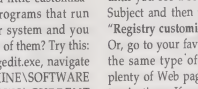
This error message displays when you try to fix the Registry from within Windows instead of DOS.

within Regedit.exe take effect immediately, and there is no "undo" facility. If you change a value and want to change it back, you either have to remember what the value was beforehand or restore your Registry from a backup.

Learning to use Regedit.exe to make changes is easy. The hard part is learning about what changes to make. Use the left pane of the Regedit.exe window to navigate to a specific location in the Registry. Then use the right pane to change the data associated with a particular value. To do this, simply double-click the name of the value displayed in the right pane.

Now that you've backed up your Registry before modifying it and know how to actually make changes, lets do a little customization. Do you have any programs that run every time you start your system and you haven't been able to get rid of them? Try this: Using the left pane of Regedit.exe, navigate to HKEY\LOCAL_MACHINE\SOFTWARE\MICROSOFT\WINDOWS\CURRENTVERSION\RUN. See the list of values in the right pane? Those represent programs that run at startup. Right-click the offending one and click Delete to remove it. Sayonara.

This customization is in the same neighborhood of the Registry as the last one. Perhaps you want to remove some pesky Desktop icons that just don't seem to go away. Microsoft doesn't provide a delete option for some of its icons, but that won't stop us. We're not slaves to such restrictions. Navigate to HKEY\LOCAL_MACHINE\SOFTWARE\MICROSOFT\WINDOWS\CURRENTVERSION\EXPLORER\DESKTOP\NAMESPACE. The folders in the left pane represent the various icons on the Desktop. Click one to determine which Desktop item it represents. When you find one you want to eliminate, right-click the folder (not NAMESPACE, but the one inside of it), select Delete from the context menu, and the icon is banished from the Desktop. Remember, it is always easier to remove than to retrieve. Have you made your backup yet?


Registry Scan Results
No errors found.
The system registry has been backed up already today. Would you like to back it up again?
Yes
No

Running the Registry Checker (Scanreg.exe) without the "/fix" option simply checks the Registry's integrity.

While there are literally hundreds of Registry tweaks out there, this article can't cover them all.

One big question remains: "How do I know what to change?" This question is perhaps the hardest part about customizing your system via the Windows Registry. There is so much configuration information in it that it is practically impossible to understand what everything means. Since the majority of software programs store their own information in the Registry, even the folks at Microsoft can't provide a complete inventory of the information contained in the Registry.

Fortunately, there are a number of good information sources out there. Perhaps the quickest and most broad method you can use is to search the Web. The *Smart Computing* Web site (http://www.smartcomputing.com) has several articles relating to the Registry. Scroll down to the middle of our home page until you see a search field labeled Enter A Subject and then type in such keywords as "**Registry customize**" and "**Registry tweak.**" Or, go to your favorite search engine and do the same type of search. You should find plenty of Web pages that list numerous customizations. If you're looking for a specific customization, add another keyword to your search text.

Another option is to visit your local or online bookstore. Books detailing Registry secrets abound; there's even a "Windows 98 Registry For Dummies" title if you feel like spending money and being insulted at the same time. Regardless of how you discover the hundreds of useful Registry tweaks, remember to create backups, be conservative, and have fun. LS

by C. Reid Turner

How To . . .

Troubleshoot The Config.sys & Autoexec.bat Files

Although Windows 95 was supposed to free the PC world from the vestiges of DOS, even Windows 98 Second Edition still has skeletons of DOS lingering in its closets. Provided primarily for backward-compatibility with older software, DOS is definitely traveling the path of the dinosaurs. There are still occasions, however, when a little DOS knowledge can go a long way. Additionally, you can often improve Win98's boot time just by doing a little Config.sys and Autoexec.bat tweaking.

But before diving in and editing Config.sys and Autoexec.bat files, it's best to make backup copies. While you can't really (or permanently) "break" a computer or Win98 by editing these files, it's still a good idea to back up system files. There are many ways to back up and edit Autoexec.bat and Config.sys files, but one of the best utilities, the System Configuration utility, isn't even documented in typical Win98 manuals. To begin, click Start, Run, type **msconfig** in the field, and click OK. Next, click the Create Backup Button.

These steps will start the program and create a backup of your Autoexec.bat and Config.sys, as well as your Win.ini and System.ini files. If you get into trouble and want to restore backup copies, follow the steps below.

1. As your computer boots, hold down the F8 key (or the CTRL key on some systems).
2. When you see the menu, use the arrow keys to select Safe Mode, and press ENTER. (Some systems can automatically boot into Safe Mode if users hold down F5 instead of F8 or CTRL in step 1.)
3. Once Windows has booted, run the System Configuration utility as described previously.
4. Click the Restore Backup button, then Yes.
5. Once you're done restoring, you can reboot Win98 normally.

Now that we've covered the essentials of creating and restoring backups of your files, we can cover the Msconfig.exe utility itself. First, you will see six tabs: General, Config.sys, Autoexec.bat, System.ini, Win.ini, and Startup. Although we'll focus on the Config.sys and Autoexec.bat tabs, we'll also discuss the Startup tab because it can be useful for troubleshooting Win98. The System.ini and Win.ini files, much like the Autoexec.bat and Config.sys, are only present for backward-compatibility with older Windows versions. We won't be covering these files in this article, however, and tinkering with them is beyond the scope of this article.

First, select the Config.sys tab. If your system has a fresh installation of Win98, this tab may be entirely blank (just as the Autoexec.bat tab might be blank). Don't worry if this is the case; it is normal. Otherwise, you will see lines preceded by checkboxes. To disable a line, uncheck the box next to it by clicking it and removing the check mark. Any lines in either the Config.sys or Autoexec.bat files that begin with REM are already disabled. (In the old days, if you wanted to disable a line without deleting it, you typed **REM** in front of it and saved the file.)

Now, before you go rampantly checking and unchecking boxes, let's spend some time getting familiar with these files and what some of the more common lines you'll see in them are.

Config.sys. The Config.sys file is the Configuration System file, and its primary use is loading DOS device drivers such as CD-ROM drivers, mouse drivers, and others. The most common lines you'll see in a Config.sys file are:

```
DEVICE=
FILES=
BUFFERS=
```

The DEVICE line loads device drivers. They could look like any of the examples below.

```
DEVICE=C:\WINDOWS\HIMEM.SYS
```
(loads a Windows Memory Manager)

```
DEVICE=C:\WINDOWS\EMM386.EXE
```
(loads an Expanded Memory Emulator device)

```
DEVICE=C:\CDROM\CDROM.SYS
/D:OEMCD001
```
(loads CD-ROM driver)

The FILES and BUFFERS lines tell DOS how many files can open at the same time, and how many buffers (each buffer being a small chunk of RAM [random-access memory]) to use as a temporary disk cache to help improve performance. Neither of these is needed by Win98 and can be safely disabled.

What You Need To Know

Benefits
Improve Windows 98's performance and run DOS programs better

Tools
Msconfig.exe utility program

Time
10 to 30 minutes

Skill Level
Intermediate

The exact DEVICE lines will vary from system to system, but Win98 does not generally need these devices, especially Emm386.exe, an expanded memory emulator. If you are a strict Windows user and use only Windows programs, you should be able to safely disable all DEVICE lines loading, including Emm386.exe.

Device lines in the Config.sys file that load CD-ROM drivers are best left enabled. They don't generally interfere with Win98 in any way, and they can be useful if you opt to take advantage of the Dosstart.bat file for shutting down to DOS Mode while retaining CD-ROM functionality. (We'll touch on that a little later in this article.)

Autoexec.bat. The Autoexec.bat file loads after the Config.sys file and runs Automatically Executed Batch files. If you want your computer to run ScanDisk or other programs each time it boots, you could put the appropriate command in the Autoexec.bat file. You can also use the Autoexec.bat file to load drivers, such as a mouse driver, sound card drivers, and the DOS CD-ROM extension MSCDEX. (In addition to the device driver in the Config.sys file, Mscdex.exe is necessary for DOS to be able to communicate with the CD-ROM.) A basic Autoexec.bat file may contain lines similar to those listed below.

PATH=C:\; C:\WINDOWS; C:\WINDOWS\COMMAND (see below for details)

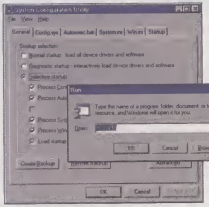
LH C:\MOUSE\MOUSE.EXE (this line is loading a mouse driver from the C:\MOUSE directory)

LH C:\DOS\MSCDEX.EXE /D:CDROM

SET <various>

The PATH statement tells DOS the directories in which to look for commands that are not located in its kernel. For example, the DIR command is part of the basic DOS kernel (think of it as built into the engine). However, a special command such as ScanDisk.exe is not part of the kernel (it could also be called an external command), so DOS will need to know where to look for this command on the hard drive to be able to find and run it. If the PATH statement reads PATH=C:\DOS, this means that each time an external command is typed, it will look for the command in the DOS directory located on drive C. If it cannot find it, it will tell you "Bad Command or File Name." As in the example, the PATH statement can be long and list multiple directories, each separated by a semicolon.

Win98 and its programs do not, as a general rule, need the PATH statement, so you may be safe in disabling it, but it is not really necessary and it doesn't interfere with Win98 anyway. Some older Windows 3.x (and even a few Win9x programs), as well as most DOS programs, are dependent on the PATH statement to tell them where to look for information, so It is usually best to leave the PATH statement enabled in Autoexec.bat.



To back up and edit Autoexec.bat and Config.sys files, access the System Configuration utility by clicking Start, Run and typing msconfg in the field.

DOS Baggage. Mouse drivers (loaded either in the Config.sys or the Autoexec.bat files) and Mscdex.exe (loaded in the Autoexec .bat file) are definitely not needed by Win98. In fact, Mscdex.exe might actually interfere with Win98 or reduce CD-ROM performance. To check on this, right-click My Computer, click Properties, and select the Performance Tab. If you see a window with the message, "Some drives are using MSDOS compatibility" and the drive indicated is your CD ROM drive, Mscdex.exe may be part of your problem. Try disabling it from the Autoexec.bat file to improve performance. (Should you encounter problems, just re-enable it.)

Sound card drivers are also commonly stored in either the Config.sys or Autoexec.bat file. Here is an example of lines typically placed into an Autoexec.bat file by Creative Labs' Sound Blaster Live! software.

SET BLASTER=A240 I2 D1 H7 P330 T6

SET CTSYN=C:\WINDOWS

C:\PROGRA~1\CREATIVE\SBLIVE\DOSDRV\SBEINIT.COM

If you play DOS games or use DOS applications, you may want to leave these lines enabled. If you are a strict Win9x user, however, you can safely disable them. If you frequently use DOS for older DOS software and games, another option is to make use of the Dosstart.bat file.

Dosstart.bat. Every time Win98 shuts down into DOS Mode, it executes commands (if any) in the Dosstart.bat file, located in the C:\WINDOWS folder. The Dosstart.bat file acts just like the Autoexec.bat file except that it is executed when Win98 shuts down (and not during boot up). If you have drivers loading in the Autoexec.bat file such as mouse drivers, sound card drivers, and the DOS CD-ROM driver Mscdex.exe, you can remove these lines from the Autoexec.bat file and copy them to your Dosstart.bat file. This will improve the boot-up time for Win98, remove potential compatibility issues, and keep essential peripherals functioning in DOS Mode.

How can you do this? Simple. First, open up the Msconfig.exe utility as described at the beginning of this article, and then follow these instructions:

1. Click Start, Programs, Accessories, and Notepad. This will open an empty text file.
2. Select the Autoexec.bat tab in the Msconfig.exe utility to view the contents of your Autoexec.bat file.
3. Click the line of your Autoexec.bat file you want to copy into your Dosstart.bat file. This will highlight the line. Press CTRL-C on your keyboard.
4. Now, click in the Notepad window and press CTRL-V. This will automatically copy the line.
5. When you have finished copying all the lines you want, go to the Notepad menu bar and click File, Save As.
6. In the Save As window, type **c:\windows\dosstart.bat**. This saves the file to the Windows directory on drive C.

Be aware that any changes made in the Msconfig.exe utility can be readily undone (if you have a backup), and most are safe enough to experiment with (if you understand what you're changing). It's hard to "break" Win98 with this utility, and if you do, you can usually just boot into Safe Mode, run Msconfig.exe again, and undo your changes with the Restore Backup button. As long as you're careful and back up your files beforehand, you should be safe. In time, you'll learn a little about your PC, run your DOS software smoothly, and put a little spring in your Win98 system's step. LS

by P. Bryan Edge-Salois

How To . . .

Make Manual COM & IRQ Settings

Windows 98 uses Plug-and-Play technology to install new devices effortlessly. If you replace your monitor and install a new one, the Plug-and-Play process makes it very easy. Connect the monitor to the back of your computer, plug in its power cord, and start up your computer. Because Win98 is Plug-and-Play enabled, it finds the best way to configure itself to use the new device. All this is done behind the scenes so you're not even aware that it's happening.

But sometimes there are problems that require your intervention. If Win98 doesn't recognize a new printer, for example, it stops automatically configuring and asks you for advice. It might say it found new hardware and asks if you want to install its **device driver** (software tailored specifically for a particular device that lets Windows control or "drive" the device).

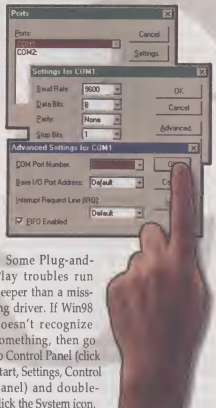
A device driver, or driver, is important to a computer system. Often a peripheral hardware device, such as a printer or scanner, will work with a generic driver, but to obtain peak performance, it's best to use the driver created for that specific brand and model. A piece of equipment usually comes with its manufacturer's driver on a diskette or CD. Insert the CD and tell Windows where to look for it. Alternatively, most manufacturers have drivers that you can download free of charge from their Web sites.

What You Need To Know

Benefits
Debug the installation of a new peripheral

Time
20 to 30 minutes

Skill Level
Intermediate



Some Plug-and-Play troubles run deeper than a missing driver. If Win98 doesn't recognize something, then go to Control Panel (click Start, Settings, Control Panel) and double-click the System icon. Click Device Manager to see a list of devices. Click the plus sign next to the device you're having trouble with. Highlight it and click the Properties button. Click the Resources tab and double-click devices marked with a yellow exclamation mark, which indicates an IRQ (interrupt request line) conflict and look in the Conflicting Device List box for details. Write down what it says about conflicts and click Cancel to return to Device Manager. Highlight Computer and click Properties again. You'll see a list of numbers and devices. Look for a number between two and 15 that is not listed.

Back To The Basics. Before solving the problem, let's review Plug and Play. It lets Win98 read a peripheral's brand and model and what settings Win98 needs to use and operate the device correctly. Plug and Play also requires the BIOS (Basic Input/Output System).

Your PC communicates with peripherals through the BIOS. It controls the communication of signals and data between your monitor, printer, modem, network card, scanner, speakers, hard and diskette drives, keyboard, mouse, and anything else you've got connected. Win98 tells the BIOS what it wants, and the BIOS controls each device on your system. Often, Win98 has trouble with a Plug-and-Play device because of a setting in the BIOS.

There are two common computer cards on your motherboard. The long ones are ISA (Industry Standard Architecture), and the short ones are PCI (Peripheral Component Interconnect). While both are still being sold, computers older than a few years don't have PCI slots. Unlike Plug-and-Play-enabled PCI boards, ISA cards sometimes need to have BIOS setting's changed to make Win98 work with a device.

The BIOS setting you'll have to change is the IRQ. An IRQ is a signal the BIOS uses to control each device. When you click your mouse, an IRQ is sent to inform the BIOS, which "interrupts" what the BIOS is doing to get attention. The BIOS uses more than a dozen IRQ lines. It assigns one IRQ to each device so it knows which device is calling. Win98 sets IRQ settings for PCI, so the following remedy applies to ISA.

To get to the BIOS, reboot and wait for the screen with rapidly changing numbers. Near the bottom of the screen you'll see a message saying which key to press to change the BIOS, such as Delete or F1. Press that key. Look around for the list of IRQs and then look for instructions to change one of the numbered IRQs (to one that wasn't on the list) so it says ISA or legacy. Make the change and reboot.

After Win98 starts, go back to Device Manager and double-click the device with the yellow exclamation point. Go to Resources and enter the IRQ you just changed. Uncheck the box for Use Automatic Settings and click the Change Settings button. You can change the IRQ by clicking the Up or Down arrows. Leave the IRQ at a setting that does not conflict with any other device. Click all of the OK buttons and reboot.

When your computer boots up, check Device Manager again to make sure there are no yellow exclamation marks. If everything's clear, you're new device is operating. If you see another yellow exclamation mark, go through all of the steps again. You may have to do this several times until you've got the BIOS IRQ settings matching the Control Panel's settings. LS

by Drew Robb

How To . . .

Troubleshoot Network Problems

It just hasn't been your best day. Your network has just turned into a *not*work and the resources you need to get your work done have suddenly vanished. Fear not, because most network problems are easy to diagnose and even easier to fix. Here, we'll help you get started on the track back to full functionality.

Hopefully, your problem has caused the network to stop operating completely. These problems are much easier to figure out and fix than intermittent problems that appear and disappear at random. We'll talk a little bit about intermittent problems toward the end, but for now we'll assume the network isn't operating at all. We're also going to assume your network was operating at some point because troubleshooting a failed installation is a little outside the scope of this article.

Hardware Problems. There are two classes of problems that can disable a network: Your trouble is going to be either with hardware (a physical problem that prevents the network from operating) or in software, where a network program has been corrupted, disrupted, or destroyed. We'll start on the hardware side where problems are easier to spot and repair.

The first thing you should check is that the network resource you want is actually available. The computer the resource is on may simply have been turned off and will be unavailable until you start that computer back up. This is really common, especially on small networks. If you received an error message at startup, it's not the network, it's your computer, and you'll need to move on. The most common message is similar to "Your 'XYZ' brand network adapter is not working properly and has been disabled." Surprisingly, this usually indicates a problem with software rather than hardware.

The physical components of a computer are so reliable now that adapters almost never fail all by themselves. However, outside influences can cause cards to fail. In fact, it's not uncommon for lightning to kill the network card even though the rest of the computer is operating normally. In addition, plugging a digital phone line into a network adapter can fry it just as quickly. Another way that cards can be disabled is by installing other new cards that conflict with the network card for access to system resources. We'll talk about diagnosing this in the software problems section, as well.

The best place to start when diagnosing a hardware problem is with the network cables. First, make sure the cable is still securely plugged into the back of your computer. If there are status lights on the back of the adapter, make sure the proper ones are on. On an Ethernet network, there should be a green light for "link," or the basic connection between the computer and hub. If the light is orange, there may be a problem with the cable.

Now, follow the cable back to the network hub or switch, making sure it hasn't been cut, frayed, or kinked along the way. When you get to the hub, make sure the network cable is securely plugged in here, as well. While you're back there, make sure the hub or switch is turned on.

Now it's time to see if there is any connection between the computer and hub at all. There should be a green light next to the port your cable is plugged into. If you don't see a light, there is no link between the two devices. If the light here is orange, the network adapter may be damaged. Unplug the cable and plug it into any other available port. If the light turned orange here too, your network adapter is damaged and you'll need to replace it.

An orange light on the hub indicates there is bad data coming through the cable and the hub has turned off or "partitioned" that port so it doesn't affect any other computers. Green lights on both ends tell you both devices are

What You Need To Know

Benefits
Learn how to diagnose and repair common small network problems

Tools
None, but Internet access other than across the network can be helpful

Time
15 minutes to 4 hours

Skill Level
Intermediate

working properly and that the cable is also good. A green light on the hub and an orange light on the computer means the cable is wired incorrectly and needs to be replaced.

If you haven't found the problem yet, the last step is to try the network card manufacturer's diagnostic program. Not all network card vendors supply these programs, so you may not have one. If you do, it's well worth your time to run it and see if it detects any internal problems on the card.

The bad news is this is about all you can do to troubleshoot your hardware without special tools. The good news is these few steps will identify about 95% of possible hardware problems.

Software Problems. Network software problems are usually due to problems with network **drivers**, which are the programs that tell Windows how to use that particular network card and how you'll use that card to talk to other computers. Windows is notoriously fragile in this area. When you install a network card, you're also installing five or more drivers that will be used for communications. Every one of those drivers has to be configured just so for the network to work, and the drivers all have to be loaded in the proper order. Just one incorrect parameter or one program out of order can keep the whole setup from working.

Network drivers can encounter problems if you install other programs or drivers. The new program may install a newer version of a file you needed or change a parameter that will make the new software work better, but stop your network cold. You can check to see whether this has happened and try to fix it by using the Device Manager.

Click the Start button, select Settings, click Control Panel, and then double-click the System icon. Now, click the Device Manager tab at the top of the window. Look for the list of network adapters, and if your network card's name appears right under that with a big yellow *X* next to it, you're closer to the problem.

If Windows thinks everything is fine, it's time to dig a little deeper. Fortunately, the Windows help system includes the Network Troubleshooter that leads you through a suggestion-and-answer session for some common network problems. To start the Network Troubleshooter, click the Start button, select Help, click the Contents tab, and then select Troubleshooting. Next, click Windows 98 Troubleshooters and then Networking. You'll see a list of common network problems that you can choose.

Each item guides you through a number of steps and questions designed to help narrow in on the problem. Even if the Troubleshooter doesn't solve your troubles, it may give you a suggestion that will lead you to the solution. You also can go from the Troubleshooter to Microsoft's Online Support if your computer has an Internet connection (other than across the network, of course).

We still have a few tricks up our sleeve if you're still not up and running. If your network has TCP/IP (Transmission Control Protocol/Internet Protocol) installed, click Start, select Run, and type **winipcfg** in the Open field. You should see a box open called IP Configuration. Check to make sure the IP Address line has something other than "0.0.0.0" in it. If the entry is all zeros, your network isn't working because it was unable to obtain an IP address from an external server or other device. Click the Renew All button and wait a few minutes. If a valid address appears, you should be back in business.

If instead of the normal window you got a box with a red *X* that says Invalid IP Configuration, we've found the problem because your network settings have become corrupted. It's not terribly uncommon, but it can be a pain to fix. Click Start and select Settings, Control Panel. Next, double-click the Network icon to open the Network window. Inside the window is a list of installed network components. If the list is empty, your settings are really messed up and you'll need to reinstall Windows. Reinstalling Windows will force a new installation of the Windows Registry, where all the network settings are kept. You'll need your Windows CD-ROM and any CD-ROMs or diskettes that contain other drivers.

If the Network window opened and looks normal, grab a pen because you'll need to write down some things. Click each item on the installed components list and then click Properties. Look at every tab for that component and write down the present settings because you may need them later. Once you're sure you have all the information, you're ready for the next step.

Click the network adapter on the list and then click Remove. Every component associated with that adapter should disappear. Click OK and Windows will prompt you to reboot the computer. If your network adapter is Plug and Play, Windows will automatically reinstall the driver and other network components. If the adapter is older, you may have to return to the Control Panel and select Add New Hardware to reinstall the driver.

If you had to manually install the driver, you'll also have to install the network components. Double-click the Network icon in the Control Panel and then click the Add button. You'll need to install and configure a client and one or more protocols, depending on your network type.

There are many ways to fix network problems, but we've covered the most common ones and their best fixes. Deleting and reinstalling all the drivers is drastic and time-consuming, but it usually fixes the problem. LS

by Jeff Shapiro

See The Light

Your networking hardware comes with status lights for a reason. Check the color of the lights on both the computer and the network hub or switch and then refer to this chart to figure out where the problem lies.

Computer	Hub or Switch	Indicates
No light	No light	Bad network card or a bad driver. Check for software problems first, but you may need to replace the network card.
Green	Orange	The network card is bad; you'll need to replace it.
Orange	Green	Reversed polarity on network cable; you need to replace the cable and then check for software problems.
Orange	Orange	You have a bad network cable and a bad network card, so replace both.
Green	Green	Everything on the hardware side is working, so check for software problems.

How To . . .

Stop People On The Network From Accessing Your Files

You wouldn't think of leaving valuables in an unlocked car in a bad neighborhood, but you may not give a second thought to leaving information-packed files unprotected on any network to which you're connected. If you're like most people, you probably want to maintain the confidentiality of the information in the electronic files you create: trade secrets, personal notes, company memos, or even your grandmother's famous cookie recipe.

Luckily, you can tap into some of Windows 98's features to prevent people on your network from accessing your confidential files. Depending on how your system is set up, your network administrator might control some security features, but others can be set up by the local user: you. We'll look at the different types of security you can add to your system. After you look at the options, you'll be in a better position to choose the best mix for your situation.

What You Need To Know

Benefits
You will be able to keep the information on your network secure and private

Time
1 to 2 hours to initially set controls and passwords

Skill Level
Intermediate to Difficult

Password Basics. One classic way to protect your system is to set up passwords. Think of a password as the key that lets you unlock the door to a particular resource such as your computer, a drive, or specific files. Accordingly, you can set various types of passwords on your system, depending on which resource you want to protect. For example, you can set up passwords to limit access to Windows, the network, printers, or your files.

As you make up your passwords, keep the following in mind: To make a password hard to crack, it's a good idea to use a mix of letter and numbers; techhead547263 is harder to decode than techhead. Also remember that many passwords are case sensitive, so don't forget how you used uppercase and lowercase letters in your password.

Your Personal Pass To Privacy. When more than one person shares the same computer, you can use separate user profiles to keep your information secure. In this way, the Desktop, display options, and MY DOCUMENTS folder will display the preferences of each specific user. To access your profile, simply enter your Windows private username and password each time the computer starts up. (Your Windows password is separate from your network password, the one you use to connect to the network, if you are part of one.)

To add a user profile, click the Start button; select Settings, Control Panel; and then double-click the Users icon. Step through the Enable Multi-User Settings Wizard and click Finish when you are done.

To change your Windows (or network) password, make sure you're logged on to the system with the existing username and password. Double-click Passwords in the Control Panel to display the Passwords Properties dialog box. Click the Change Windows Password button in the Change Passwords tab to modify the password you use to display your settings for the Windows 98 Desktop. Click the Change Other Passwords button to revise your network password.

Network & Screen Saver Passwords. If you walk away from your PC to get a cup of coffee or attend a quick meeting without logging off the network (or setting a screen saver password), you might be leaving your computer vulnerable to prying eyes. To prevent this, first make sure a network password and logon procedure is in place on your system. (This is usually in the hands of your network administrator.) Then, to prevent others from physically accessing your files, log off your system every time you leave your work area.

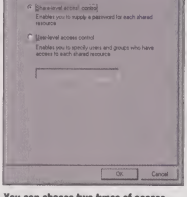
If logging off the entire system every time you leave your desk sounds too cumbersome, use a screen saver password instead. Right-click a blank spot on the Desktop and choose Properties from the pop-up menu. In the Display Properties dialog box, click the Screen Saver tab and choose a screen saver from the drop-down menu in the Screen Saver section. Check the Password Protected checkbox and then click the Change button to display the Change Password dialog box. Enter (and then confirm) your password and click OK. Close all dialog boxes. Now the next time you press a key or move your mouse to clear the screen

saver, you'll also be prompted for your screen saver password.

One final note on passwords: While adding passwords can protect your system from nosy co-workers, don't create so many that you lose track of them. You might accidentally lock yourself out of the very system you're trying to protect. If you need to, keep a hard copy of your passwords somewhere close enough to be handy but not obvious enough to cancel out their usefulness.

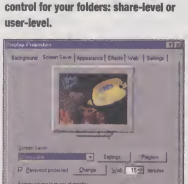
Ready, Set, Control. Another way to keep prying eyes away from your files is to use access control. In Win98, you have a choice of two types of access control: share level and user level.

Share-level access control lets you restrict who can use resources, such as folders, drives, and printers, by assigning a password to each one. Anyone who knows the password for a resource can use it, making it easy to share resources with a number of people without a lot of fuss. However, this benefit is also the feature's weakness. What happens if a password falls into the wrong hands or is more widely distributed than you intended?



You can choose two types of access control for your folders: share-level or user-level.

In contrast, you set user-level access control by compiling a list of people or workgroups who can use the file or folder. Because the users are already on a master list (which is usually maintained by a network administrator), they don't need a specific password to use the resource because their presence on the list has already given them permission.



Setting a screen saver password will protect your information when you step away from your computer for a moment.

Prepare To Use Access Control. Before you can set up either type of access control, however, you must first indicate that you want to share your computer's resources. To do this, double-click the Network icon in the Control Panel. In the Configuration tab, click the File And Print Sharing button.

In the File And Print Sharing dialog box, click the checkboxes that indicate which type of resources (file or printer) you want to share. Click OK, keeping in mind that you may need to insert your Win98 CD or wait for system updates. When Windows finishes updating your system, close the Network dialog box. Again, Win98 may take a moment to update your system. You'll also be prompted to restart the computer so the new settings will take effect.

Share-Level Control. Now you're ready to determine which type of control to use: share-level or user-level.

By default, Windows uses share-level, but if someone has switched your system to user-level, here's how to switch it back. Double-click Network in the Control Panel to open the Network dialog box. Click the Access Control tab and then select the Share-Level Access Control radio button. Click OK, close all dialog boxes, and restart your computer so that the new settings will take effect.

After the computer is fired up again, you're ready to assign share-level control to specific resources. Double-click the My Computer icon on the Desktop and right-click the resource (such as a folder or drive) to which you want to limit access. (You can also right-click a printer in the PRINTERS folder.) Choose Properties from the shortcut menu to display the Properties dialog box, then click the Sharing tab. Select the Shared As radio button and then designate how you want to limit control (for example, by making a folder Read-Only). Optionally, you can enter and confirm the password you're assigning to the resource. When you finish, click OK and close all dialog boxes.

User-Level Control. If you prefer to tap into user-level control, double-click the Network icon in the Control Panel, click the Access Control tab, and select the User-Level Access Control radio button. Enter the group that the network should pull authorized users from in the Obtain List Of Users And Groups From box, click OK, and then close all dialog boxes. Again, you'll be prompted to restart your system to complete the switch from share-level to user-level control.

After the system reboots, right-click the resource to which you want to add user-level control and then choose Properties. In the Sharing tab, select the Shared As radio button. Click Add, and then indicate the users with which you want to share the folder. Now you're ready to indicate the type of access (sometimes called permissions) that you'll allow: Read-Only access allows the user to view but not modify the file. Full Access, just as its name implies, means that the user can read, delete, and modify files. Custom access gives the user whatever privileges you decide.

If you want to remove these sharing privileges from a drive, folder, file, or printer later, reverse the process: Locate and right-click the resource, then choose Properties. On the Sharing page, choose Not Shared, then click OK.

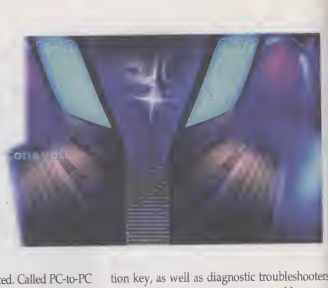
Use Software-Level Controls. As a final option, you can add a password to each individual file that you want to protect. For example, in Microsoft Office programs, you can open the file to which you want to add a password and then choose File, Save As. In the Save As dialog box, choose the Tools menu, General Options. Enter (and confirm) your passwords to both open and modify the file in the File Sharing Options... section before clicking OK. Now you'll be prompted to enter your password the next time you want to open or modify the file.

Windows provides several methods of protecting your information, so choose which ones work best for your situation. Then relax, knowing that your key information (including that great cookie recipe) will remain under wraps. LS

by Linda Bird

How To . . .

Troubleshoot Direct PC-To-PC Connections



Admit it; like many users with more than one PC, you initially scoffed at the idea of installing a network. Sure, you understood the benefits to linking them: pooling resources, sharing files, printers, back-ups, and the best reason of all, Internet access. But the thought of popping the top of your CPU (central processing unit), fiddling with network cards, learning complicated networking software, and dealing with cables snaking all over your home and/or office promptly ended the discussion.

Imagine your surprise when you discovered there were several simpler, easier, and more practical ways to get connected. Called PC-to-PC connections, these work-around solutions include: connecting two PCs with a parallel or serial cable, using existing phone lines to wire boxes, piggy-backing data on existing electrical lines, or flying data over a wireless network.

The good news: All three are no-brainers to install and relatively inexpensive, starting at $15 to $25 for a cable to $150 to $200 for wireless kits, such as Intel's AnyPoint (http://www.intel.com/anypoint). Even better, unlike traditional Ethernet and other hard-wired networks, these connections are easy to maintain and troubleshoot. In fact, if there's a problem, chances are it's also extremely easy to fix once you track it down to the source.

Ah, but as Hamlet, or rather, Shakespeare, said, "There's the rub."

Since these network workarounds use Windows as a base, they're susceptible to the same whims and vagaries, such as damaged device drivers, system crashes, viruses, and bugs, that plague standalone systems. Of course, each PC-to-PC connection comes with its own set of software and hardware peccadilloes that only compound the troubleshooting process.

So how can you tell if your network is suffering from poor software configuration, a damaged cable, or faulty wiring or if a dishwasher is causing interference and slow throughput? Read on.

For this article, we're making a few assumptions: You're using one of the ad hoc PC-to-PC network solutions discussed above; you successfully installed one of them; and at one time, you've had everything working as advertised.

If you've having an immediate problem getting a particular product to work right out of the box, go directly to the company's Web site or call its tech support number. Most products also have an extensive help section that you can usually activate by pressing the F1 function key, as well as diagnostic troubleshooters designed to track down common problems.

What You Need To Know

Benefits
Recognize, understand, and track down common problems associated with PC-to-PC ad hoc networks; improve performance between linked PCs; and gain knowledge about your system.

Tools
Phillips or flathead screwdriver, a computer toolkit, and, possibly, replacement serial or parallel cables. You may want third-party utilities.

Time
15 minutes to several hours

Skill Level
Easy to Intermediate

Cost
$$$ Free to less than $100

Solving Hook-Up Hiccups. Why does a network stop working or begin misbehaving? The first question to ask, advises Steve Church, president of homePCnetwork.com, a two-year old company devoted to helping users network their home PCs, is what's changed?

Have you added a new piece of hardware or switched hardware? Have you installed or uninstalled software or downloaded a nifty must-have utility? Perhaps you've rebooted a PC after an improper shut down or disconnected and reconnected a cable, wire, or peripheral. If not, remember you're sharing PCs with other people who may have.

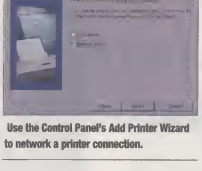
Ask network users. Check with family members and co-workers, but don't be surprised if none of them owns up to the tinkering.

Simple solutions first. Look for the most obvious solutions. Try to reboot the problem away by shutting down both PCs, then restarting them. If your PCs are connected with a cable or cords from either the electrical or phone outlets, make sure the cables are all properly connected. Is everything turned on, plugged in, and attached correctly? If your printer isn't working, make sure it's online, there's paper in the tray, and the surge protector hasn't been tripped.

Divide and conquer. Try disconnecting the PCs from the network and see if each works independently. If both computers work separately, the problem lies in their hook-up. If one works, but the other doesn't, try tracking down the problem using Windows' built-in troubleshooters or diagnostic utilities, such as McAfee Office 2000 for $49.95 (http://www.mcafee.com) or Norton SystemWorks for $49.95 (http://www.symantec.com).

Cable ready. If you're linked using an Ethernet connection or something like Intel's

AnyPoint, look at the back of your PC for a small light near where the cable plugs in. If the light is glowing steadily, the cable is good. If the light is dark or flashing intermittently, you have a cable problem. Removing and reinserting the cable will help a weak connection. Otherwise, replace any cables that are crimped or have loose connectors.



Use the Control Panel's Add Printer Wizard to network a printer connection.

Frequency interference. If your wireless network suddenly stops working, try moving the PCs closer to each other. Radio signals are generally weak and signals degenerate after 150 feet. Most wireless RF-based (radio frequency) products can handle some structural interference, but too much may retard the signal. Beware of interference from other wireless devices, such as cell phones, pagers, keyboards, and your mouse. Try replacing batteries in the receivers. Also, know that many wireless network kits don't let you mix and match add-in and PC Cards from different manufacturers.

Phoney lines. If you have multiple phone lines, make sure you're running each PC over the same phone line. It's normal to notice a small drop off in transfer rate when using the phone line for a voice call while, at the same time, copying files from one PC to another. Old or poorly installed phone wiring can degrade performance. If you're having problems, ask the phone company to check the lines. Buy wire insurance to cover inside wiring problems.

Power-line problems. Network kits that send signals through your home's AC (alternating current) can be waylaid if your PC is too far from the transformer, says Church. Also, large appliances can cause interference and slow throughput. Move your PCs closer to the transformer and do laundry later. Also, Church says to forget about using standard surge protectors or extension cords with AC-line products because they filter out the data; use the surge protectors packaged with the kit.

Look who's talking. Windows 95/98 (Win9x) have simple network diagnostics that can quickly determine if one PC is receiving signals from the other. If not, the problem lies in the connection. If they are, the problem is software related, and perhaps an internal setting needs to be adjusted or reconfigured. Go to Start, Help and click the Index table, then type **network, troubleshooting** in the keyword field.

Conflicts of interest. Changing or installing new hardware is the easiest way to knock out a network connection as one device conflicts with or overwrites another. To quickly determine if there's a problem, open the Control Panel (click Start, Settings), select System, double-click Properties, and select the Device Manager tab. If a component, say a printer or network device, is marked with a yellow circle and exclamation point, it means the component is either not working properly or is conflicting with another device. You may have to delete the driver, reboot your PC, and let Windows Plug-and-Play reinstall the component.

Check ports. Don't forget something as simple as a bad port connection, says Church. To check for a port problem, unhook the cable linking your PCs and connect an external modem to the serial port and/or printer to the parallel port. If they don't work, you'll have to replace the damaged port. If you are using a serial port connection, make sure the cable is Null Modem. Don't forget to disable modem and/or fax software as many programs wrest control of the port. The same goes for any Palm Pilot or other PDA loading port capture software.

Common PC-to-PC Connection Problems.

Here are five common network problems associated with PC-to-PC connections and how to solve them.

Can't access drives on another PC. Mapping a drive makes accessing a drive in another PC as easy as accessing a drive in your own PC. To map a drive, double-click the Network Neighborhood icon on the Windows Desktop (or click Start, Settings, and Control Panel and double-click Network Neighborhood), double-click the PC you want to access, and click the drive you want to map. Right-click that drive, select Map Network Drive, and pick a letter, for example, *E* or *X*, to represent the drive.

Can't share printer, files, and other peripherals. The sharing features are not turned on. Open Control Panel, double-click the Network icon, click the File And Print Sharing button. Check both boxes. To specify which components you want to share (for example, you may want to deny children access rights to your financial records), open Windows Explorer and select a drive, printer, or folder. Right-click and choose Sharing, click the Shared As button, and type a Share Name. To protect sensitive information, you can add password protection.

Remote PC can't see and/or share printer. Open Control Panel, double-click Printers, and right-click the default printer. When the Properties box appears, click the Sharing tab, click the Shared As button, and click OK. Next, go to the other computer, open its Control Panel, double-click Printers, and double-click Add New Printer. When the Add New Printer box appears, click Next. Select Network Printer, click Next, browse to the other computer, and highlight Network Printer, which automatically installs it in the network path.

Spikes in performance. Understand this is normal, and it's especially noticeable in PC-to-PC network solutions, says Church. For example, when both PCs are downloading large files at the same time over a shared 56Kbps (kilobits per second) dial-up connection, occasionally the network software will split bandwidth between both PCs. There's not much you can do about this aside from learning to live with it or switching to broadband Internet access. You can, however, goose your hard drive into faster performance. Open the Control Panel, double-click System, and click the Performance tab. Under Advanced Settings, click File System and then click the Hard Disk tab. Under Settings, click the drop-down arrow next to the Typical Role Of This Computer field and change Typical to Network servers. Click OK twice to close.

Invaders may hack into my network. Shield's Up (http://www .grc.com), a free utility from Gibson Research, checks your PC's level of protection from nasty Internet invaders. Both Norton Internet Security 2000 (downloadable for $53.95 from http://www.symantec.com) and McAfee's Personal Firewall ($39.95 for a one year subscription at http://store.mcafee.com) provide first line of defense protection.

Not Working Yet.

If you're still knocked out by a network problem, your first stop should be the manufacturer of the software, hardware, or peripheral that you think is causing the problem. If you can't find answers, check third-party tech support sites, such as ePeople (formerly NoWonder.com, (http://www.epeople.com /home.jsp), VirtualDr.com (http://www.virtualdr.com), and PC PitStop (http://www.pcpitstop.com). Chat rooms in sites, such as homePCnetwork.com, let you get advice from other home networkers. LS

by Michael Cahlin

How To . . .

Troubleshoot An Overheated System

Heat is your computer's enemy, but ironically, heat is also the largest by-product of its normal operation. If you've ever touched a hot household lightbulb, you have some idea of the heat a typical desktop computer's parts produce.

When electronics become too hot, they eventually fail and produce errors. Overheating symptoms usually show up after the computer has been running for a while and heat has had time to build up. Here, we offer some tips to find and fix problems if you suspect your system is overheating.

(NOTE: Some of the following suggestions involve opening the computer and working on internal parts. Be aware that this may void your warranty. In addition, always observe antistatic precautions, such as working in a low-static area and touching the computer's metal chassis before you start working to discharge excess static electricity.)

CPU Overheating. Your computer's CPU (central processing unit) produces a phenomenal amount of heat, especially during complex tasks such as gaming, sound and animation rendering, and playing movies. If your computer crashes often, locks up suddenly, or reboots unexpectedly, it could be a sign that the CPU is overheating.

Machines built within the past couple years also have a hardware monitor built into the BIOS (Basic Input/Output System), which analyzes various power levels and temperatures. You can access the monitor by pressing DELETE or F2 during boot-up. Alternatively, you can use a software utility to read it in Windows. This is probably the better way because you can monitor temperature changes while stressing the processor with other applications. Your motherboard's CD-ROM should contain monitoring software. You also can go online to find good hardware-monitoring software. Motherboard Monitor (http://members.brabant.chello.nl/~a.vankaam/mbm) and MBProbe (http://web.bham.ac.uk/jst829/mbprobe) are notable downloads. If the CPU temperature gauge reads higher than 150 degrees Fahrenheit (66 degrees Celsius), you've probably found the problem.

You also can try the "touch test." While the computer is running, open up the case and carefully touch the CPU's heat sink (a small metal device that looks like a grill; the heat sink draws heat away from the CPU) with your fingertip or a thermometer. The heat sink should be warm to the touch, but it shouldn't burn your finger (less than 150 degrees F or 66 degrees C). If the heat sink is cool, it might have come loose from the CPU and isn't drawing off enough heat, so try to reattach it. If the heat sink is extremely hot and painful to touch, check the attached fan if one is present. The fan should be running quickly and quietly with its blades free from obstruction. If the fan is fine, you should consider upgrading to a heat sink with more cooling power.

Power Supply Overheating. Your power supply provides electrical current to all the other parts of your computer. It converts the power from your wall outlet to DC (direct current) and changes the voltage to meet the computer's needs. This conversion process generates heat, but the power supply has a built-in fan that keeps it cool. If the fan stops working, sticks, or runs too slowly, the power supply will overheat. Additionally, if your power supply can't handle the computer's needs, it will overheat and fail. Certain processors (such as AMD's Athlon line) draw a lot of power, as do high-speed hard drives. Having many internal peripherals, such as several hard drives, can also stress the power supply.

If you notice hot (not just warm) air or a burning smell coming from the power supply, it's probably overheating. Other symptoms include spontaneous shutdown, rebooting, or loss of power in components. The aforementioned hardware monitor will show any dropping voltage levels. If there is a problem with the power supply, you'll probably need to replace it.

Video Card Overheating. Newer high-powered video cards often have even more transistors than a CPU so adequate cooling has become an important issue. If after prolonged use you experience slowdowns or lockups in 3-D applications, glitches in graphics, or screen blackouts, overheating may be the cause. Try the touch test on the video card's heat sink; if it's really hot, you've likely found the problem.

Keep Cool. If you suspect overheating, try to identify which part is getting too hot and then find a way to cool it down. Fix any problems with cooling equipment such as fans and heat sinks, and if you need to, buy replacement coolers or add more to the system. Check out The Tech Zone (http://www.thetechzone.com) and The Heatsink Guide (http://www.heatsink-guide.com) for reviews of cooling products. LS

by William Van Winkle

What You Need To Know

Benefits
Find and fix overheating problems so your internal devices keep working

Tools
Hardware-monitoring software, screwdriver, and a thermometer

Time
30 minutes to 2 hours

Skill Level
Easy to Intermediate

How To . . .

Recover From System Lockup

The surest guarantee of being able to retrieve documents after a system crash is saving regularly as you work; backing up system files; implementing the proper autosave settings in applications you frequently use; carrying out routine preventive maintenance tasks; and knowing the limits of your operating system, hardware, and software.

Has Your Computer Crashed? The answer is not always as obvious as it may seem. It never hurts to wait another couple of minutes to see if the computer finishes its task(s). If your mouse doesn't respond, if you can't get a blinking cursor on-screen, if the computer's lights and sounds cease—and especially if all of these are true—your system is probably locked. Of course, if you just asked it to perform a memory-intensive database query or save a lengthy document with heavy formatting and several images, give your system the benefit of the doubt and get a cup of coffee while it finishes. If, when you return, nothing has changed, press CTRL-ALT-DELETE to display the Close Program dialog box, which shows all programs currently running. If one is frozen, you'll see "Not Responding" in parentheses after its name. Select that program, click End Task, and then click it again. This will close the offending program (and unfortunately, delete unsaved work in that program).

In the above scenario, your system as a whole hasn't crashed. The Close Program feature lets Windows 95 and 98, unlike previous incarnations, prevent one hung-up program from bringing down the whole system. System-wide crashes are more likely heralded by one of the infamous error messages warning of "fatal exceptions," "general protection faults," or even (gasp) the "Blue Screen of Death." If your screen turns blue with white code, you may have been running too many programs at once, or perhaps a program tried to access a system file or a part of the hard drive that it had no business accessing. Installing and removing software can often cause applications to chase after files they can't find or rely on old and inadequate ones.

Find & Restore Files After A Crash. When you reopen some programs after a crash, such as Microsoft Word, you'll see a recovered copy of the document you were working on when the system went down. The document will have the same name as the original file with "Backup Of" in front of it, and the file type extension becomes .WBK as opposed to the default file type of .DOC. *Save this recovered document immediately with a name other than that of the original file* (and by saving it as a Word document, the .WBK extension changes to .DOC). Don't close it and continue looking for the original because once you close a recovered document, it's gone forever. And if you also lose the original, you have no version of the file at all.

Word will create this type of backup document for you if you select the Always Create Backup Copy checkbox in the Options dialog box (click Tools, Options, and the Save tab). Word can also automatically save changes to your original file if you open that same dialog box, select the checkbox beside Save AutoRecover Info Every X Minutes, and then specify the desired time interval. Don't rely on either method as a substitute for saving your files regularly because that's your only guarantee that all your changes will be recovered after a crash.

Check for comparable features in your other software. AutoSave is an add-on feature in Microsoft Excel that isn't installed by default. Microsoft PowerPoint has the Fast Save and Save AutoRecover Info Every X Minutes options, but not the Always Create Backup Copy option. Corel WordPerfect has a feature called Timed Document Backup (through the File, Preferences, and File icon choices).

After saving a recovered document (or if one never appeared when you restarted the program), look for your original file. If you can't find the original file, look for all backup copies of files and temporary files. Temporary file names begin with a tilde (~), have a .TMP extension, and are usually found in the TEMP directory on your hard drive. (This is why you should exercise discretion when deleting temp files; retain any from the last couple days.) You also can explore OfficeRecovery.com (http://www.officerecovery.com). Its specialty is to recover files created by Microsoft Office applications.

What You Need To Know

Benefits
Maximize chance of recovering data after program and system lockup

Tools
Built-in Windows utilities, storage media (diskettes, Zip disks, etc.), and possibly third-party utilities

Time
10 minutes to 1 hour for regular maintenance tasks, file search, and restoration

Easy to Intermediate

Skill Level
Easy to Intermediate

$$$

Cost
$5 to more than $100 for storage devices and media such as diskettes, Zip drives, and disks; $40 to $80 for third-party utilities, if necessary

Backup & Recovery Utilities.

What if your crash was so serious that you can't even find one version of your document? Or, even worse, what if a system file was lost or corrupted, or you can't start a program or even Windows itself? If so, then it's time to turn to utilities, such as those in Win98 or third-party software. If your crash was caused by bad sectors on your hard drive, or if system files have become corrupt, you'll want to use Win98's ScanDisk to find sectors that are bad, as well as repair them and look for lost or deleted files.

Click Start, Programs, Accessories, System Tools, and ScanDisk. Select the drive you want to scan and choose Standard or Thorough. After a crash, you probably should run a Thorough test, even though it takes much longer. (Click the Advanced button to see what tests and repairs ScanDisk can perform.) Let ScanDisk perform repairs and compile a report for you; however, don't count on being able to reconstruct any files it finds into readable documents.

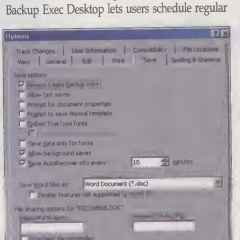
If ScanDisk tells you it has found a problem that it can't fix, and you still haven't made a complete backup of your entire system, do so immediately, because you may be headed for a total crash from which you can't recover.

Another Win98 utility you can use from System Tools is System File Checker. Click Start, Programs, Accessories, System Tools, and System Information. Then, click System File Checker from the Tools menu. System File Checker can help restore corrupted system files.

Other companies' utility programs and packages provide additional tools. One of the most commonly used is Norton Utilities from Symantec ($39.95; 800/497-6180, 408/253-9600; http://www.symantec.com/nu), a package of programs for protecting and recovering files. It also provides emergency diskettes you can use to boot up your system after a crash. In addition, Norton's CrashGuard utility steps in the moment a crash happens, and its SystemWorks kit has a VitalSave feature that tries to save the data seen on-screen that the user hasn't saved yet at the time of a crash.

You can also try some of the utilities available online. SecurDat from PA-Soft (free; http://www.pa-soft.com/frameenglish.htm) lets you indicate which drives to perform backups on, and can keep copies of several previous versions of those files. Another utility package you can try is Reynolds DOS Utilities ($79; 800/223-7483, 303/776-7110; http://www.data-recovery.com/reynolds/main.html), which warns you of possible system file problems and then backs up, repairs, and restores files in your partition table, boot sector, FAT (file allocation table), and root directory. It operates in DOS to get to the structure underlying Windows and make a copy.

Or, you can check out Veritas Backup Exec Desktop ($79; 800/327-2232, 407/531-7501; http://www.veritas.com/us/products/bedesktop45). Backup Exec Desktop lets users schedule regular backups and specify which files are the most important. A free trial version can be downloaded for 30 days from the trial software section of its site (http://www.veritas.com/us/trialsoftware.html).



Let Microsoft Word create a backup copy of your document so you can recover it if the program freezes or your system crashes.

Why Crashes Happen.

Like people, computers can freak out when forced to do too much at once. Plus, companies (with sometimes conflicting interests) produce software and hardware that mesh in theory, but not always in practice. This also creates conflicts. For example, applications might use DLL files (dynamic-link library) they shouldn't or install an old DLL file over a new one that other software depends on. Or, hardware might use a resource already reserved for another component. But there are several things you can do to minimize crashes.

One, make sure all hardware and software you install is compatible with your OS version. Two, when adding new peripherals, check the sites of your OS and the hardware manufacturer for the latest drivers. Three, develop a sense of how many programs you can realistically run at once, and turn off memory-consuming programs, screen savers, or wallpaper that you don't need. Four, check for hardware resource conflicts. And finally, you should routinely perform a set of preventive maintenance tasks.

For starters, defragment your hard drive regularly, as well as after periods of intensive work or the installation/uninstallation of several applications. When you want to uninstall a program, use the "uninstall" utility that came with the program or use Windows' Add/Remove Programs tool from the Control Panel. Don't manually delete a program's folder because doing so frequently doesn't delete all of the program's files, leaving fragments behind. Or, even worse, you may accidentally delete files needed by other programs. In addition, use updated and thorough antivirus software, and protect your hard drive from heat and dust.

Finally, consider hard drive space and memory. Even if you think you have enough RAM (random-access memory) to handle computing tasks, have you left enough of your hard drive space for the "**swap file**" that acts as an occasional aid to RAM? To free up some hard drive space right away, delete some of your old Temp files, graphics files, and cached Web pages.

Backup Strategies.

Most importantly, you need to back up your system so you have all the tools and data you need after a crash. To back up everything at once, click Start, Programs, Accessories, System Tools, and Backup. Select the drive and media you want to back up your data to (your best choice is to choose external media, such as a Zip disk or CD-RW [CD-rewriteable]). After all, if your hard drive crashes, recovery will be easier and more complete if your backup files are elsewhere. Another alternative is to investigate companies that provide storage space for your files online.

If the Win98 Backup tool isn't installed on your system, add it by using Add/Remove Programs (from the Control Panel) and your Win98 installation CD-ROM.

You should also remember to back up your Windows Registry (by clicking Start, Programs, Accessories, System Tools, System Information, Tools, and Registry Checker). And just in case you can't restart Win98 after a crash, you'll want to have a Windows backup diskette on hand, too. From the Control Panel, click Add/Remove Programs, and select the Startup Disk tab. Next, insert a diskette and click Create Disk.

Most of all, make sure you have your own backup plan in motion. Drive image programs can "mirror" data by making exact copies of your hard drive, which you can use later if you need to do a complete reinstallation. One example of a product that features such qualities is Norton Ghost from Symantec ($69.95; http://www.norton.com). LS

by Andrew Pollack

How To . . .

Overcome Password Problems

There are three types of password protection you can use to protect your computer and data: CMOS, Windows, and data file. In this article, we will tell you what to do if you forget any of these passwords.

CMOS Password. Many computers allow you to set a CMOS (complementary metal oxide semiconductor) password. This password must be entered before the computer will boot. Think carefully before using this, as dealing with a lost password is difficult.

Once you realize you cannot remember your CMOS password, you should call the PC's maker. Some manufacturers have a default password (called a backdoor), and they may be willing to give it to you if you can prove you are the rightful owner. If that does not work, try calling the maker of the motherboard and BIOS (Basic Input/Output System). Some common backdoor passwords include "ami," "award sw," "cmos," and "password." These are case sensitive, so try both lower and upper case.

If this does not work, you will have to reset the CMOS password. Many system motherboards have a jumper to do just this. If your system lacks a password reset jumper, you will have to erase the entire CMOS. This will also erase the hard drive type, date, time, and power settings so you will have to re-enter these, though most CMOS programs will auto-detect the hard drive setting. If your program shows this information before prompting for a password, write it down.

To reset the CMOS, you must unplug the system and remove the internal battery for several hours in order for the charge to drain out of the CMOS circuitry. If the battery is soldered in, there may be a jumper to disable it. Set the jumper to disable the battery while the CMOS drains. If the battery is soldered in, and there is no disable jumper, you will have to take your PC to the shop so someone can unsolder the battery long enough to drain the CMOS. Go ahead and have the person put in a new battery now to avoid having to replace it later.

Windows Password. The Windows password simply controls access to an account that lets you store personalized Desktop and menu settings. You can bypass logging in by clicking Cancel in the dialog box. Doing so means that the menu and Desktop you see may not have all the settings you expect, but all the programs will run, and you will be able to open all the data files. You can erase an account and all its passwords by deleting the associated PWL file in the Windows subdirectory.

While you cannot unlock a password-protected screen saver without knowing the password, you can reboot, and the computer will restart without the screen saver engaged. You can then disable it without knowing the password by using Regedit.exe to search for the key. Go to Start, Run and enter regedit in the Open: window. Work your way down the folder tree until you find:

HKEY_CURRENT_USER\Control Panel\Desktop

Double-click the ScreenSaveUsePassword value in the right-hand panel and change its value from 1 to 0 to remove the password from the screen saver.

Data File Password. Many programs allow you to password protect your data files. For example, in Microsoft Excel, you click the Options button in the Save As dialog box to enter a password. This is a weak form of password protection that is easily bypassed. To understand why this protection is weak, you must understand the difference between encryption and password protection. With encryption, the password is used to scramble all of the file. When you decrypt, the program simply uses the password you supply to reverse the scrambling process. Provide the wrong password, and you get nothing useful out of the decryption process.

Most programs want to be more user friendly, and they tell you when you enter the wrong password. That means the program must be able to read or figure out the password used when the file was saved. If the original program can do this, a password cracking utility can too.

For example, the Password Recovery Kit (http://www.lostpassword.com) can read a data file and figure out the password for all Office programs, Lotus 1-2-3, Microsoft Money, Paradox, Project, Quicken, WinZip, and many more. Other shareware programs can do the same, so you may wish to check your favorite source.

On one hand, it is comforting to know that there are ways to recover your lost passwords. However, it is also disquieting to know that an intruder can use these same techniques to gain access to your computer or your private data files. Your only true protection is to store your data files on removable media that you lock up or to use an industrial strength encryption program to encrypt all your sensitive data files. LS

by Ronny Richardson

What You Need To Know

Benefits
Regain access to your computer when you've forgotten the password.

Time
5 minutes to 1 hour

Intermediate to Difficult

Skill Level
Intermediate to Difficult

How To . . .

Troubleshoot Windows Shutdown Problems

If Windows 98 has been operating normally but will not perform the shutdown routine, there are a number of steps you can take to diagnose and resolve the problem. Although it may be possible to simply turn off your computer and restart it by turning it back on, this is not recommended because it can cause data loss and file corruption. The sooner you are able to properly shut down Win98, the safer your data and system files will be.

On The Surface. When Win98 shuts down, it may appear to hang (stop responding) for several minutes. This is normal because Win98 is handling a number of operations during this time. These include: completing all disk-write functions, including the updating of any system settings that have changed; emptying the disk cache, where unneeded files, such as temporary files created by programs and Web pages saved during browsing, are stored; closing all open programs; and returning all protected-mode drivers to real mode.

If more than a few minutes have passed, and you haven't received a message prompting you to turn off the computer, or if you have received an error message (usually Windows Protection Error) instead, you can assume the system has not been able to shut down properly. Try to shut down using a soft boot (press CTRL-ALT-DELETE and click Shut Down). If this doesn't work, it's time to start troubleshooting.

Known Issues. According to Microsoft representatives, there are several known issues that can cause shutdown problems in Win98. We will discuss these first and then move on to troubleshooting routines that can help you diagnose and resolve the more generic problems that occur with Win98.

Fast Shutdown Registry key is enabled. If you are using Windows 98 Second Edition, a feature called Fast Shutdown may cause your system to restart instead of shutting down when you are in MS-DOS mode. To disable this feature, click the Start button (restart your system, if necessary) and select Run. In the Open field of the Run dialog box, type **msconfig.exe** and click OK.

When the System Configuration Utility dialog box opens, click the Advanced button on the General tab. If the Disable Fast Shutdown option appears, click the box and restart your computer to see if that solves the problem.

Antivirus programs. If you are running a McAfee or Norton antivirus program that is configured to scan your diskette drive when you shut down your computer, your computer may stop responding, the diskette drive light may turn on, or you may receive a Windows Protection Error message. Contact the manufacturer of the antivirus program to see if there is an update available that will repair the problem. To work around this problem until you can install an update, configure the antivirus program so it doesn't scan your diskette drive when you shut down the computer.

Incompatible sound card. If your system hangs during shutdown and you receive the "MSGSRV32.EXE Caused A General Protection Fault In Module CM8330B.DRV" GPF (general protection fault) error message, it is because your computer uses a sound card or modem that is based on an incompatible chip. (Other error messages reference "CM8330B.DRV" or "Module CM8330.DRV.") Contact the manufacturer to obtain an updated driver or obtain and install the latest C-Media Windows 98 driver at http://www.cmedia.com.tw.

If you receive a similar GPF with a SoundPro device, update the drivers at http://www.pcchips.com/driver.html (for a PC Chips motherboard), http://www.matsonic.com (for a Matsonic motherboard), or http://www.pcwave.com (for a PC Wave motherboard). You also can disable the hardware profile to solve the problem. (See the next section for more information.)

Looking For Trouble. If one of the known issues discussed above does not impact your computer, the problem is probably due to one of four basic problems: incorrectly configured or damaged hardware or software, program failures, conflicting or damaged device drivers, or corrupted CMOS (complementary metal-oxide semiconductor) settings or a conflicting BIOS (Basic Input/Output System).

What You Need To Know

Benefits
Resolve problems and eliminate error messages that prevent Windows 98 from shutting down properly and avoid possible data loss from improper shutdown.

Tools
Internet access

Time
15 minutes to 3 hours

Skill Level
Intermediate

Below, you'll find a list of questions to answer and operations to perform as you diagnose the source of your shutdown troubles. We've arranged the items in progressive order of difficulty; running through them in the order provided should result in the most efficient resolution of your problem.

(NOTE: Many of these instructions begin with restarting the computer. To do this, click Restart on the Shut Down Windows dialog box that appears when you use the Shut Down command in the Start menu. If it does not appear or isn't working, try the soft boot procedure offered above. As a last result, turn the computer off, wait 15 seconds, and turn it back on.)

When the system failed to shut down, did you receive a Windows Protection Error? A Windows Protection Error means an error occurred unloading a VxD (virtual device driver; virtual device drivers act as a simulation buffer between applications and hardware; the drivers sort out and ensure the correct application gets the information). In many cases, you can tell from the error message which VxD is either missing or damaged; if so, write it down.

Use the Windows System File Checker to search for the file. From the Start menu, select Programs, Accessories, System Tools, System Information and then select System File Checker from the Tools menu. Check the first option to allow Win98 to search for the file; use the second option if you have the file name and a Win98 CD-ROM.

Has anything in the computer changed since it worked correctly the last time you shut it down? If so, check to ensure that all new installations are compatible with the hardware and software already on your computer. Consult the device manufacturer or its Web site to see whether updated drivers or patches are required to run the equipment with your version of Windows. If nothing has changed, proceed to the next question; if it has, skip ahead to the fourth one.

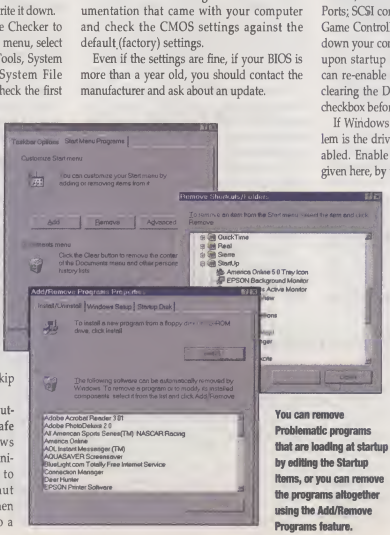
Can you shut down the computer after you've restarted it in Safe mode? In Safe mode, Windows uses default settings and the minimum device drivers required to start Windows. If you can shut down Windows in Safe mode, then the problem is probably due to a program failure or a conflicting or damaged driver. (Proceed to the fourth question.) If it does not shut down properly, even in Safe mode, your Windows installation may be damaged. (Proceed to the fifth question.)

To restart in Safe mode, press and hold the CTRL or F8 key as you restart until the Microsoft Windows 98 Startup Menu appears. Enter the menu number for Safe mode and press ENTER.

Are your system's CMOS and BIOS settings correct, and do you have the newest version of the BIOS? It is possible for CMOS or BIOS settings to become corrupted due to battery failure, viruses, and other reasons. In addition, some of Win98's features, such as IRQ (interrupt request line) Steering, which allows multiple peripheral devices to share resources, and Plug and Play are not supported by older BIOSes.

Restart your computer and make note of the year and manufacturer of your system's BIOS. If any settings have become corrupted, you will probably receive a "CMOS Checksum Error" message. Consult the documentation that came with your computer and check the CMOS settings against the default (factory) settings.

Even if the settings are fine, if your BIOS is more than a year old, you should contact the manufacturer and ask about an update.



You can remove Problematic programs that are loading at startup by editing the Startup Items, or you can remove the programs altogether using the Add/Remove Programs feature.

Are all your hardware devices installed and operating properly? The Win98 Device Manager can help you detect device conflicts that could be causing your system to hang at shutdown. To troubleshoot your hardware configuration, click the Start button, select Settings, click Control Panel, and then double-click the System icon.

Under the Device Manager tab, look for exclamation marks in a yellow circle, which alert you to system conflicts. If any devices show alerts, disable them by clicking the device, clicking the Properties button, and then checking the Disable In This Hardware Profile box on the General tab. Click OK and then restart the computer and attempt to shut down. If this solves the problem, you will need to reinstall the device and may need updated drivers from the manufacturer.

If no devices show alerts, disable all devices in the same fashion as above under the following items: Display Adapters; Floppy Disk Controllers; Hard Disk Controllers; Keyboard; Mouse; Network Adapters; PCMCIA Socket; Ports; SCSI controllers; and Sound, Video And Game Controllers. Now, restart and then shut down your computer. If you receive a message upon startup that no mouse was found, you can re-enable it from the Device Manager by clearing the Disable In This Hardware Profile checkbox before proceeding.

If Windows properly shuts down, the problem is the driver of one of the devices you disabled. Enable them, one by one in the order given here, by unchecking the box from the previous step and restarting and shutting down the computer after each one: COM Ports, Hard Disk Controllers, Floppy Disk Controllers, and other devices in no particular order.

If you isolate a troublesome device, delete it from the system by clicking the Remove button in the Device Manager. When you restart the computer, Windows should detect the device and allow you to reinstall it. If not, use the Add/Remove Hardware option in Control Panel to reinstall it.

See if a clean installation of the driver solves your shutdown problems. If not, you should contact the manufacturer for updated drivers or patches.

Can you shut down after performing a clean boot of your system? A clean boot is a procedure used when troubleshooting system problems; it temporarily strips away the files that contain system and device information. The System Configuration Utility tool (Msconfig.exe) manages the clean boot and lets you selectively restore files until the problematic one is isolated.

To perform a clean boot, click the Start button and select Run. In the Open field, type **msconfig**.exe and then click OK. When the System Configuration Utility window opens, click the Selective Startup radio button on the General tab and then click to clear all seven checkboxes: Process Config.sys File, Process Autoexec.bat File, Process Winstart.bat File, Process System.ini File, Process Win.ini File, and Load Startup Group Items.

Click OK, restart the computer when prompted, and attempt to shut it down. If this works, use the System Configuration Utility to see which operations are causing difficulties by rechecking the boxes in the following sequence, restarting after each addition. (When the system fails to shut down, you have located the offending file and can skip the remainder of the testing)

- Process System.ini File and Process Win.ini File. If the problem occurs when both boxes are checked, try again with only one checked to determined which is causing the problem.
- Add Process Autoexec.bat File
- Add Process Config.sys File
- Add Process Winstart.bat file
- If the problem does not occur with all these items checked, an item in the Load Startup Group Items is responsible.

Uncheck all boxes and then select the checkbox for the file you suspect is causing the problem. Next, select the Same-Name tab from the menu of options along the top of the window. Click to clear the bottom half of the checkboxes on the list of items that appears and then restart and shut down your computer again.

If the shutdown problem persists, one of the entries that is selected is causing the problem. If the problem does not occur, one of the entries that is cleared is causing the problem.

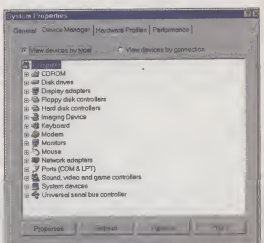
In the first case, clear half of the remaining entries, restart, and then shut down the computer again. In the second case, click to select half of the file entries that are cleared and then perform the restart/shutdown routine. Continue in this fashion until you have isolated the specific file that is causing the problem.

If the problem entry is in the Config .sys, Autoexec.bat, Win.ini, or System.ini file, you'll need to use the System Configuration Editor (Sysedit.exe) to edit the file and disable the appropriate line(s). Click the Start button, select Run, type **sysedit** in the Open field, and click OK.

Now, open the Window menu and click the appropriate file name, such as C:\ WINDOWS\System.ini. Type **REM**, followed by a space at the beginning of the line causing the problem. Next, open the File menu, click Save, Exit, and then restart your computer. It should now shut down normally.

If the problem entry is a program on the Startup tab, remove the program from the Startup folder by clicking the Start button and selecting Settings, Taskbar & Start Menu. Click the Start Menu Programs tab and then the Remove button. In the Remove Shortcuts/ Folders window, double-click Startup, click the appropriate entry, and click the Remove button. Now, click Close, OK, and then restart your computer. It should now shut down normally.

Another option would be to delete the program entirely using the Add/Delete Programs option in the Control Panel. Deleting and reinstalling the program may work, as well.



The Device Manager provides an overview of all devices connected to the system and offers insight into device and resource conflicts.

(NOTE: If the program does not appear in the Startup folder, it is probably loading in the Windows Registry, and you will need to edit the listing. Editing the Registry is a delicate operation because any mistakes can prevent Windows from working altogether. If you want to perform this operation yourself, we recommend you consult the Microsoft Knowledge Base [http://search.support .microsoft.com] for assistance.)

Do you have enough space on your computer to install Windows into a new folder? If none of the suggestions we've given so far solves your problem, you should probably install Win98 into a new folder. (For help with this, refer to the Microsoft Knowledge Base article #Q193902.) Choose the Custom installation option and do not let Setup detect the hardware in your computer. Install only a mouse, a VGA video adapter, and a keyboard.

If the clean installation performs properly, the problem lies within your old installation of Windows. Your best bet will be to back up your entire system and either reinstall Windows or use the new installation. Then, reinstall all programs and hardware one at a time, checking after each to see if the shutdown problem has reappeared. If it has, contact the manufacturer of the problematic item for further assistance.

The routines we've discussed here should solve nearly all shutdown problems in Win98. If they don't, the fault probably lies with your hardware and cannot be corrected without further assistance. Your next step should be to contact your computer's manufacturer. LS

by Jennifer Farwell

Help For Win98 Second Edition Users

If you're using Win98 SE, Microsoft offers an Update Supplement that addresses a variety of known shutdown problems. However, Microsoft does not recommend universal application of the supplement because it applies only to users with specific hardware and software configurations. Rather, the company suggests users apply it if other potential causes of shutdown problems have been eliminated.

If you haven't installed the Update Supplement on your computer, and you have eliminated other potential causes of shutdown difficulties, you may want to download and apply the supplement before you reinstall Windows. To access it and get more information, visit http://windowsupdate .microsoft.com. ☐

How To . . .

Get A Faster Internet Connection

If you're using a 56Kbps (kilobits per second) analog modem, you're in a huge majority, and many of you can't even buy a faster Internet connection. But while many parts of the country still don't have reasonably priced broadband service, you can tweak your existing modem connection to coax more speed out of it. And even if you already have broadband, you might be surprised to know you also can enjoy faster service.

Is Your Modem Up To Date?

Even having a 56Kbps modem is not necessarily enough to assure you of the fastest connections available with a dial-up modem.

There are three distinct 56Kbps modem standards, and if you bought your modem between 1996 and 1998 and haven't upgraded, chances are that you have one of the wrong ones. Who's who in the 56Kbps modem game?

The first 56Kbps standard to hit the market was US Robotics/3Com's X2 standard. While X2 was first, it didn't last. Few ISPs (Internet service providers) still support X2 modems.

The second 56Kbps standard to arrive was K56flex, championed by chipset maker Rockwell, modem maker Zoom Telephonics, and others. K56flex, unlike its rival X2, is still widely supported by ISPs, letting you dial in and reach speeds above 33.6Kbps in some cases.

The definitive standard, V.90, was developed by the ITU (International Telecommunications Union) in 1998. V.90 is supported by all ISPs that support 56Kbps connections.

If you have a modem that uses one of the superseded standards, you may be able to upgrade it to the V.90 standard if it uses upgradeable firmware. Firmware is software-on-a-chip, the part of the modem that gives the modem its "personality" in terms of its connection speed and connection type.

What You Need To Know

Benefits
Faster Internet connections, letting you receive downloaded files, e-mails, and Web pages quicker.

Tools
A screwdriver (if you decide to open your system to check your modem or network card type)

Time
Less than half an hour

Intermediate to Difficult

Skill Level
Intermediate to Difficult

New Firmware & Drivers.

Even if you have a V.90 modem, modem development hasn't stayed still since the V.90 standard was introduced in 1998. Because all 56Kbps modems must create a digital connection between the ISP's modem and yours to achieve speeds above 33.6Kbps for downloads, issues such as line noise and signal quality can have a major impact on your modem speed.

By upgrading the firmware in your modem and replacing the drivers your OS uses to access the modem, you can solve reliability and connection problems with your modem.

New firmware and drivers for your modem come from the company that produced your modem. Make sure when you go to the modem maker's Web site that you download the correct firmware and driver files for your modem. You can use the 56K.com Firmware page at http://www.56k.com/links/Firmware_Updates as a shortcut to the latest firmware files by modem brand and model.

If you have a modem that came installed in your computer, you may have a hard time determining the manufacturer. You can use the FCC ID# lookup at the popular WinDrivers.com

Web site (http://www.windrivers.com/company.htm) to locate your modem's manufacturer. The FCC ID# is on a sticker attached to one side of your internal or external modem. WinDrivers.com also lets you find modem drivers by card type or by going to its alphabetical manufacturers' listing.

What if your modem came from a defunct manufacturer, making it a so-called "dead board"? Windrivers has a "dead board" section that contains the latest driver files known for defunct products. You can also check the Who Made My Modem? section of the 56K.com Web site to learn how to find your modem manufacturer without opening your computer (http://www.56k.com/trouble/noname.shtml).

If your modem uses the Lucent chipset, you may be able to choose from either a generic firmware/driver combination or one labeled for your modem by the manufacturer. See http://808hi.com/56k/ltwin.htm for information about the Lucent LT Winmodems sold by many manufacturers.

The details of the firmware installation process vary, but generally it works like this:

1. After you determine the correct brand and model number of your modem, you go to the manufacturer's Web site and find the correct file(s) to download. They are usually stored as self-extracting .EXE files. If they are stored as

.ZIP files, you will need to use a program such as PKWARE's PKZIP (http://www.pkware.com) or WinZip (http://www.winzip.com) to extract the files from the archive.

2. Download the file(s) to your hard drive. If the Web site lists installation instructions, download them, too. Make sure you download matching driver files for the firmware version.

3. Store each downloaded file in its own folder on the hard disk and extract its contents.

4. In some cases you must make a diskette from the downloaded file to use for firmware updates. If so, use a blank, formatted diskette when you copy the update.

5. When you run the firmware update program, make sure that power will not be interrupted to the modem. Changing the contents of the firmware chip can take up to three minutes, so if a thunderstorm is approaching, you should wait until the storm passes.

6. The firmware update may also automatically install new modem drivers for your operating system. If not, install matching drivers yourself after the firmware update process is complete.

At the end of this process, you will have a "new" modem for virtually no cost. If your modem was the reason you had slow download performance before, you should have faster performance now.

■ **Dial-Up Performance Tips.** Now that you have modem and Internet connection are current, tweak your connection speed.

Use the right dial-up number. As you learned earlier in this article, there are three 56Kbps standards. After you upgrade an X2 or K56flex modem to the V.90 standard, you may need to use a different dial-up number to get the maximum speed necessary.

You must also look at the dial-up numbers available to you for your 56Kbps modem. If the ISP simply lists 56K or 56Kbps as the standard, it may be able to handle all three standards at full speed. If it lists separate numbers for V.90, K56flex, and X2, make sure you use the correct dial-up number; a mismatch of 56Kbps standards will limit you to 33.6Kbps speeds.

Interference on the line. What can you do if you dutifully update your modem to the latest V.90 firmware and drivers, double-check your dial-up number, and you still aren't getting anywhere near the 53Kbps limit imposed by the FCC on 56Kbps modems?

A substandard connection between your modem and your ISP may be to blame, and the cause could be as close as your home telephone system, or it could be beyond your control.

First, make sure the telephone line you're using is capable of 56Kbps-quality performance. While it has its limitations, one of the best tests you can perform is still the free US Robotics/3Com 56Kbps line test. Instructions for this test are available online at http://www.3com.com/56k/need4_56k/linetest.html.

If this line test indicates that your telephone line cannot support 56Kbps speeds, you most likely are the unintentional victim of cost-cutting measures that telephone companies have introduced recently to keep up with the continuing surge in telephone number and exchange requirements. Some of the equipment being installed to add extra capacity can prevent modem performance from rising above 33.6Kbps by adding an additional analog/digital conversion to the telephone line that runs from you to your ISP. These 56Kbps modems allow only one analog/digital conversion in their ISP-to-your-modem connection.

If the line test indicates that you should be able to reach 56Kbps speeds, look inside your home for potential problems.

First, take a good look at the "silver satin" phone cord that connects your modem to your telephone jack. Internally, it contains two twisted wires that make up a twisted pair. The silver jacket provides protection against physical damage, but no electromagnetic shielding.

If you're not getting speeds above about 40Kbps to 45Kbps with your 56Kbps modem, try making the following changes to your telephone connections at home:

- Keep your cable run between the modem and the wall jack as short as possible
- Replace telephone wire with cracks or cuts in the jacket with fresh, supple wire
- Disconnect the telephone or answering machine from the modem's second phone jack
- Run the telephone wire straight from the modem to the wall jack, bypassing splitters, inline connectors, and surge protectors

To see whether any of these issues are causing substandard performance, make one change at a time, then check your connection speed.

You can even get interference from other phones on the same circuit, even if they're in another room. So if you're still facing substandard performance, you could try unplugging those phones as well.

Richard Gambert's "v.Unreliable" 56K Web site at http:// www.808hi.com/56k/demarc.htm has a page describing how to plug your modem into the Telephone Network Interface box to bypass other phones in your house for testing purposes and how to overcome wiring problems for best modem performance. Keep in mind this involves some work that, in most cases, can (and should) only be done by a trained professional. Check with your phone company first to make sure. This Web site also can teach you to diagnose a substandard modem connection by listening to the buzzes your modem makes while it connects.

You'll find more tips for assuring a good connection with your modem at the 56K Web

Maximum Connection Speeds

The maximum connection speed you may achieve depends upon matching your modem type to the type(s) of modem(s) supported by your ISP (Internet service provider).

Modem Type	Connection Number Type	Resulting Connection Maximum Speed	Acceptable?
33.6Kbps or slower	56K, V.90, X2, K56flex, 33.6	33.6Kbps	Yes
X2	X2, 56K	56Kbps	Yes
X2	56K, V.90, K56flex	33.6Kbps	No
K56flex	56K, V.90, K56flex	56Kbps	Yes
K56flex	X2, 33.6	33.6Kbps	No
V.90	56K,V.90	56Kbps	Yes
V.90	X2, 33.6	33.6Kbps	No

Any combination of modem type and connection number type with a Yes in the Acceptable column can provide the maximum speed your modem is capable of, up to 56Kbps.

Connections labeled No limit the maximum speed of your modem to 33.6Kbps, which is a big decrease for 56Kbps users. □

site at http://www.56k.com/trouble/connect.shtml.

Tweak your MaxMTU with EasyMTU. Windows 95 was the first version of Windows to use an all-encompassing Registry file to store virtually all hardware and software configuration settings. One of the mysterious settings discovered in the Registry was a setting called MaxMTU. This setting, which can vary from computer to computer, sets how large (in bytes) of a data packet Windows can receive. It is normally set to 1500, but since many routers (devices used to route Internet data between networks) use a packet size of 576, the mismatch between what Windows expects to receive and does receive can hurt the throughput of your dial-up connection.

MaxMTU is one of several settings you should adjust at the same time to set the best possible throughput: MaxMTU, MaxMSS, DefaultRcvWindow, and DefaultTTL. While there are several commercial programs that can set these, one of the best programs for changing these settings is Rob Vonk's freeware EasyMTU program. Many users prefer it because it allows fast changes to your Registry and lets you test the results of each change with its built-in benchmark feature. You can get more information and download it from http://members.tripod.com/easymtu/easymtu.

The company page at WinDrivers.com provides links by device type and manufacturer, along with special help for "no-name" products and products from defunct manufacturers.

Tweak the connection between your modem and PC. There are two speeds you may see associated with your modem. The DCE (Data Connection Equipment) speed is the "modem-to-modem" speed, which you will see displayed briefly when you make your dial-up connection. You can also move your mouse over the dial-up connection icon in the toolbar to see the connection rate.

Most of the tips earlier in this article deal with increasing this speed. Another way you may be able to boost speed is by adjusting the DTE (Data Terminal Equipment) or computer-to-modem speed.

The normal speed at which computers connect to modems is 115200bps (bits per second), although the modem-to-modem (DCE) speed is far less. If you can raise the DTE speed to 230400 and still connect to the other computer, you will also improve your modem's throughput.

To adjust the computer-to-modem connection speed in Windows 95, Windows 98, or Windows Me:

1. Open the Control Panel.
2. Open the Modems icon.
3. Select your modem and then click the Properties button.
4. Check the value listed for Maximum Speed. If it is already set to 230400 or higher, leave it alone. If it is set to 115200, click the down arrow and select 230400 if you can. If you cannot, the connection cannot be adjusted.
5. Click OK and try to connect at the higher speed.

If you can connect at the higher speed, you can keep the new setting. If you cannot connect, change the setting back to 115200 by repeating the steps above.

Many PCI (Peripheral Component Interconnect)-based internal modems and modems that connect to the USB (Universal Serial Bus) port can run successfully at DTE speeds above 115200.

To learn how to adjust the Windows Registry to permit 230400 DTE speeds for both internal and external modems, go to http://www.downloadit.gr/~v_laessig/ping.html and scroll down to the section labeled Enabling 230400 Maximum Speed (serial port speed).

Broaden Your Broadband.

Broadband connections are far faster than dial-up connections, often running at speeds of 400Kbps to 1.5Mbps (megabits per second). But you may still be able to make adjustments to improve your performance.

Registry adjustments. You may find it useful with any broadband service to adjust the MaxMTU and related values with programs such as EasyMTU (freeware) or MTU Speed Pro (shareware, $11 registration; http://www.tweakfiles.com/networking/mtuspeedpro.html). MTU Speed Pro is designed to work with network cards and dial-up connections, making it suitable for use with DSL (Digital Subscriber Line) and cable modem connections, which normally use network cards for connection with your PC.

Check cable modem hardware. If you have a two-way cable modem broadband connection, you may have a high-speed fiber-optic connection to your home, but the small amount of coaxial cable between the fiber optic service and your computer could cause as much as 80% of the problems you may see with dropped data packets and general slowdowns. Watch for problems such as:

- Obsolete cable: you should use RG-6 rather than the old RG-59 cable.
- Poor-quality fittings and cable construction: watch out for exposed shielding and staples.
- Use of house amplifiers and enhanced services cable boxes: these can cause interference.
- Splitting the cable inside the house for service to your television and computer: the splitter should be outside the home if possible.

Some of these problems are more likely with an older cable installation that's been upgraded to handle cable modem service. See about rewiring to improve reliability and performance.

Use synchronization services. You can create the appearance of faster speed for your favorite Web sites by using the synchronization feature in browsers such as Internet Explorer 5.5 and with services such as DirecPC's Turbo Webcast and Turbo Newscast. Synchronization lets you select Web sites that will be downloaded to your computer at times you specify. When you open the site, it loads instantly from the cached copy already on your system.

Use a better network card. Switching to a better-quality or faster slot design network card can also improve performance. Many experts recommend using a 3Com or Intel network card on a cable modem or DSL connection to improve speed through fewer dropped signals. A USB connection or a 32-bit PCI network card connecting to your DSL or cable modem broadband connection can also boost performance compared to an old ISA (Industry Standard Architecture)-based network card. LS

by Mark Edward Soper

How To . . .

Troubleshoot Dial-Up Connections

It happens to everyone now and then. You're trying to get your new computer connected to the Internet to resume your cyber-life of surfing the Web and checking e-mail. Even more pressing, you're traveling on business, but today is the last day to bid on your eBay auctions. We've been there, so we can walk you through a few steps to help you get connected and avoid missing any beanie baby bargains.

Troubleshooting your dial-up Internet connection can be one of the most frustrating experiences you can have while operating a computer for one big reason: There are so many possible problems that it is hard to check them all.

Hardware and software are both common culprits in connection problems. Modems malfunction, and cables crack. Windows 98 is a complicated collection of configurations, and third-party dial-up programs cause just as many headaches. Problems in the network itself, in this case, the Internet, can be the most troubling and the least controllable.

You can appreciate why problems occur with high frequency when you see how many parts must fall into place when connecting to the Internet. While troubleshooting focuses on the things you can control, we'll start by mentioning the things you cannot control.

- Phone lines are only as good as the worst one you cross. Many older lines may have background noise that interferes with transmissions and persistent connections.
- Internet traffic, traffic over the long distance phone lines and cables, may be of such high volume as to slow you down, virtually halting your movement. Early to late evenings are peak times.
- The Web site you are visiting may have unusually high traffic, say for a Victoria's Secret fashion show Web cast, or the site may be conducting server maintenance.
- You may get connected at a slower speed if your ISP's (Internet service provider's) dial-in servers are insufficient for the volume they receive or are incapable of handling more than a certain number of high-speed connections. You actually can do something about this one: Get a new ISP.

Before you throw your computer off a third-story balcony, calmly diagnose any problems caused by things that are within your immediate control, such as hardware or software. Try to make it through all of the steps outlined below before swearing off the Internet and moving to the mountains to live out your life as a hermit.

What You Need To Know

Benefits
Lets you stay connected so you won't miss important e-mail or Web sites

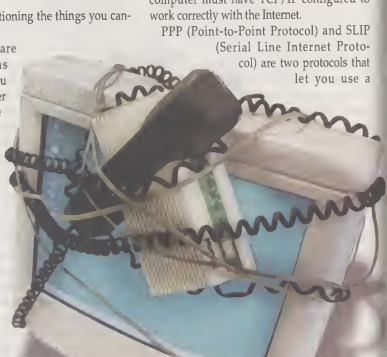
Time
10 minutes to 1 hour

Skill Level
Intermediate to Difficult

■ **Internet Basics.** Before clicking into the guts of you computer's configuration files, you should understand a few concepts and terms about Internet networking.

TCP/IP (Transmission Control Protocol /Internet Protocol) is the language that computers use to communicate on the Internet. IP addresses the data bits, and TCP does quality control during the transmission process. Your computer must have TCP/IP configured to work correctly with the Internet.

PPP (Point-to-Point Protocol) and SLIP (Serial Line Internet Protocol) are two protocols that let you use a phone line to connect to the Internet. PPP is newer and faster than SLIP, offering error correction and automatic configuration. While SLIP accounts require you to specify your machine's IP address, PPP allows the address to be randomly assigned when you log on to your ISP. If you have a SLIP account, check into upgrading to a PPP account.

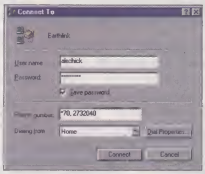


COM ports (communications ports) are serial ports used for devices such as modems. New computers have four COM ports while older ones only have two. COM1 and COM2 are physical ports on the back of the computer. COM3 and COM4 are virtual ports that can be used by internal devices. In Win98, the COM port of your modem should be automatically detected.

Parity is a procedure that checks for errors in transmissions. The number of bits are counted at the time of transmission and compared to the number of bits received on the other end of the transmission. If they are different, an error has occurred in route. This is usually turned off because it is faster to send data without checking for errors, and the effects of the errors are usually undetectable. Error checking is now built into modems, making parity unnecessary.

With these few concepts in mind, you are ready to dig in and solve some of the problems with your dial-up connection.

Check the hard wire. Get the easy stuff out of the way. Make sure the phone cord is plugged into the modem and into a phone jack. Can you verify if the phone jack is analog and not digital? You can usually assume analog in your home or a hotel, but in a new office, be careful and ask someone. A digital line may fry your modem.



Windows 98 comes with Dial-Up Networking that dials your modem and connects you to your ISP (Internet service provider).

What about a dial tone? Plug the computer into a different phone jack to rule out a bad jack. It may be easier to move a phone to test the jack than to move the computer. If the phone gets a dial tone, try switching your phone cord for the one plugged into the computer. Once you have ruled out the phone jack and cord, you can move on to the computer equipment.

Don't fight the power. Make sure your modem is turned on. External modems have lights on them that indicate they are receiving power. If the light is off, flip the switch to turn it on. Internal modems do not have power switches so it should always be on.

For no apparent reason your modem may lock up. To check if the modem is responding, press the CTRL-ALT-DELETE keys all at the same time. Only press them once, or you will reboot your computer and lose any unsaved work. The window that appears shows all of the applications that are currently running. If the modem is locked up, you will see Not Responding next to Dial-Up Networking or your ISP's dial-up program, whichever you are currently using. Highlight the program name and click End Task. If the modem is still locked up when you restart the dialer program, reboot your computer.

Drive your modem crazy. Imagine trying to put a desk together while reading the assembly instructions for a bookshelf. Something similar may be happening if you are using the wrong modem driver. The driver essentially instructs the computer on how to operate your modem. If these instructions are out of date or for the wrong model, the modem will not function properly, forbidding a connection to the Internet.

Win98 includes hundreds of modem drivers on your hard drive and even more on your Win98 CD-ROM. If your modem's specific driver is not included, you can usually download it from the manufacturer's Web site. Those of you who are reading this article because you cannot connect to the Internet should call the modem manufacturer's technical support line and ask them to mail you a diskette or CD with the drivers.

Check to see if your modem's driver is already on your machine. Go to the Start menu, select Settings, and click Control Panel. Double-click Modems and view the current driver under the General tab. If there is no modem or if the modem selected is the wrong one, click Add to install a new modem driver. Win98 will try to detect the modem for you unless you click the Don't Detect My Modem; I Will Select It From A List check box and click Next so you can select a modem from the list all by yourself. If your modem was somehow overlooked my Microsoft, select Standard Modem Types and then select the speed of the modem you have. Selecting this generic driver will not optimize your connection, but it is sometimes good for a quick fix. A generic driver might bless you with Internet access and an avenue to download your modem-specific driver.

Set your modem at ease. Even if your modem is detected properly and the correct driver is installed, it may be configured wrong. From the Start menu, select Settings and click Control Panel. Double-click Modems, highlight your modem, and click Properties. Under the Connection tab, set the Data Bits to 8, Parity to None, and Stop Bits to 1. This is the de facto standard and the fastest settings.

Next click the Advanced Button and check Error Control for a more reliable connection. Not all modems support this control, however, so it may be turned off on purpose. Check your modem documentation for specifics.

Network with yourself. The Internet is nothing but a big, huge network of connected computers. Your machine has to be enabled to become part of that network. Go to the Start menu and select Settings and then Control Panel. Double-click Network. Two selections important to you are Dial-Up Adapter and TCP/IP.

Highlight Dial-Up Adapter, then click Properties. Choose the Bindings tab and make sure that TCP/IP has a check mark beside it or it will not be using the standard protocol to transfer data. Click OK to return to the Network window.

Now highlight TCP/IP and click Properties. Unless specified by your ISP, you should select Obtain An IP Address Automatically under the IP Address tab. Most ISPs have a range of IP addresses and randomly assign you one every time you log into their server. Click OK to finish updating your network settings.

Account for dialer typos. You control your modem with an application that dials and connects you to your ISP. Some ISPs, such as Earthlink and AT&T WorldNet, provide their own applications. Win98 comes

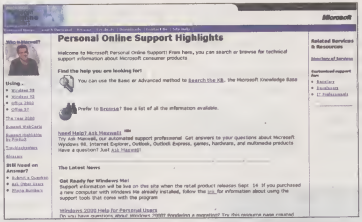
Imagine trying to put a desk together while reading the assembly instructions for a bookshelf. Something similar may be happening if you're using the wrong modem driver.

with Dial-Up Networking built in. To check the settings and avoid configuration errors in Dial-Up Networking, from the Start menu, select Programs, then Accessories, Communications, and Dial-Up Networking. Double-click the Account Dialer icon to open the Connect To window and check username, password, and phone number.

If all of these settings are correct, click Cancel and return to the Dial-Up Net-working window. Highlight your file with a single click, then select Properties from the File menu options. The General tab will specify the area code and number you are dialing, as well as the modem you have installed. Double check the number you are dialing to make sure it is correct. If the modem listed is not the one you have installed, click Cancel and return to the Drive Your Modem Crazy section above to select the correct modem and driver.

The Server Type tab lets you select PPP or SLIP account type. Make sure under Allowed Network Protocols that TCP/IP is select-ed. Click the TCP/IP Settings button. In most cases, your ISP will have a server assign you an IP address dynamically when you log into its server. If your ISP provided you with a dedicated IP address, and maybe even a DNS (domain name server) IP address, specify them both in this window, and then click OK.

Every dial-up program uses the same settings as Dial-Up Networking, although presented in a slightly different way. If you are unable to deduce your dialer program's settings from the instructions given above and the directions given to you by your ISP, contact its technical support line for more guidance.


Microsoft
Personal Online Support Highlights
Welcome to Microsoft Personal Online Support! From here, you can search or browse for technical support information about Microsoft consumer products.
Find the help you are looking for!
You can use the Basic or Advanced method to Search the KB, the Microsoft Knowledge Base.
Prefer to Browse? See a list of all the information available.
Need Help? Ask Maxwell!
Try ask Maxwell, our Automated support professional. Get answers to your questions about Microsoft Windows 98, Internet Explorer, Outlook, Outlook Express, games, hardware, and multimedia products. Have a question? Just Ask Maxwell!
The Latest News
Get Ready for Windows Me!
Support information will be live on the site when the retail product releases Sept. 14. If you purchased a new computer with Windows Me already installed, follow the link for information about using the support tools that come with the program.
Windows 2000 Help for Personal Users
Do you have questions about Windows 2000? Wondering a meaning? Try this resource page created
Related Services & Resources
Directory of Services
Customized support for:
Business
Developers
IT Professionals

When you've exhausted all of your troubleshooting knowledge and the modem still doesn't work, pay a visit to Microsoft's customer support Web site.

Resolve fights over scarce resources. Sometimes your modem and another device are trying to use the exact same resources. These kids do not play well together because they were not brought up to share. A conflict such as this can cause both devices to stop working, grinding your system to a standstill. A standard modem uses resource settings including an I/O (input/output address) and an IRQ (interrupt request line).

To check for a resource conflict, click Start, Settings, and Control Panel. Double-click System and click the Device Manager tab. An exclamation point in a yellow circle will appear next to any device that's not working. This is very likely the device conflicting with your modem. Some conflicts will not cause an exclamation point to appear, so you may have to determine the conflict yourself.

In the Device Manager tab, click the plus sign next to Modem to expand it. Double-click the modem's name, and in the Properties window, select the Resources tab. Jot down the settings for the Input/Output Address and Interrupt Request and click OK. Follow the same instructions for each device in the Device Manager. If any of the settings are the same, you need to change them so they do not conflict. Check the documentation that came with the device to find an alternate configuration.

Take special steps for long distance numbers and calling cards. When you are in Borneo on business, you may want to dial a local or international access number or even a toll-free number, or you may want to charge the call to your calling card. In these cases, you need to configure Dial-Up Networking specifically for your situation.

From the Start menu, select Programs, then expand Accessories, Communications, and click Dial-Up Networking. Highlight your file with a single click, then select Properties from the File menu options. The General tab has a space for the country code of the number you are dialing. Now double-click the Dial-Up Networking icon and click Dial Properties on the bottom right. Click Area Code Rules, and you can set the program to always dial the area code or to dial 1 before dialing specific area codes. Click OK and you will return to the Dialing Properties window.

Instead of paying those ridiculous hotel phone charges, some mobile users may charge the call to a calling card. In this case, click the Calling Card half way down the right side of the Dialing Properties window. This lets you set up a sequence for calling card calls. For example, you may specify the digits of your AT&T access number, then wait for four seconds, dial the destination phone number with area code, wait again, and finish with your calling card number. Click OK to close out all three windows and return to the main dialer window.

Some ISPs, such as AT&T WorldNet and IBM Global Network, supply customers with their own dialer applications. Contact your ISP's customer service center for help with these applications.

■ **Find More Information.** You can find even more technical troubleshooting advice at Microsoft's customer support Web site (http://support.microsoft.com/support) or call (425) 454-2030 for support of the Dial-Up Networking application.

Check any documentation that came when you signed up with your ISP. A local or toll-free call to your ISP might save you time and money over calling the Microsoft support line. LS

by Greg Schick

How To . . .

Troubleshoot Problems With Shared Modems

Sharing a modem and a single Internet connection among two or three computers makes good monetary sense. Obviously, it is less expensive to share a single connection to the Internet and a single ISP (Internet service provider) account instead of paying for a phone line and an ISP for each computer.

But what do you do if you just can't get your PCs to share one modem? It would be helpful to know a few troubleshooting tips to get the connections going between the computers.

Or maybe you were able to coax the computers to share a modem, but the connection speed is appallingly slow. You probably would like to know if there's anything you can do to improve the connection speed or if you're simply stuck with it.

Troubleshooting a shared modem can be frustrating and time consuming. I can also involve a lot of trial and error. To help make the process less frustrating, we've listed some common problems and their possible solutions.

What You Need To Know

Benefits
You'll save money by sharing modem connections and ISPs among computers

Time
Minutes to hours, depending upon the problem

Skill Level
Easy to Intermediate
Easy (checking Dialing Properties) to Intermediate (reseating internal modems)

■ **Check The Installation.** If your shared modem connection is not working, the first thing you should do, of course, is to review the installation and troubleshooting instructions that came with the modem-sharing software you are using. Don't just skim through the documentation. Read it carefully and review each step of the process to ensure that you set up everything according to the directions. Then, if you still have "no joy," try the following suggestions:

The modem doesn't work at all. Check the obvious things: that the modem is connected properly; that the connections are snug; that the modem is connected to the correct port on your computer; and for external modems, that the power is on.

For dial-up connections, make sure the line going from the telephone outlet on the wall to the modem and the line going from the modem out to a telephone, if any, are in the correct slots. The slot intended for the line going from the wall to the modem may be marked In, Wall, or Line, or it may have a rectangle outlet icon next to it. The slot intended for the line going out from the modem to a telephone (or fax machine) might be marked Out or Phone, or it may have a telephone icon next to it. (For more information, see "Troubleshoot Dial-Up Connections" in this issue.)

Use the Device Manager to make sure that the modem is using the correct COM port and that it does not conflict with anything else (Click Start, Settings, Control Panel, and Systems). Click the Device Manager tab, and in the list of devices, double-click Ports (COM & LPT) to see a list of your computer's COM ports. If the COM port your modem should be using appears in the list, then Windows recognizes and is using it.

If the appropriate COM port appears in the list with a yellow exclamation point (!) or an X next to it, something is not working properly. It could be a hardware conflict, or the port could be disabled. Double-click the COM port name, and then look in the Device Status section to see what is causing the problem. Look in Device Usage, and if there's a check in the box for Disable In This Hardware Profile, remove the check and click the port name and enable it. If there is a conflict, uninstall and reinstall the modem, selecting a different port this time. (For more information about resolving COM port conflicts, see "Make Manual COM Port Configurations" in this issue.)

You should also check the instructions that came with your hardware, operating system, and modem-sharing software, respectively, to ensure that the modem is compatible with each. If you are unsure, contact the relevant manufacturers or use another computer or Internet connection to check the manufacturers' Web sites.

The PCs won't share the modem connection. Check to make sure the computer(s) that are unable to connect are running the appropriate modem-sharing software or have started the appropriate modem-sharing service or device.

To see what is currently running on a given computer, simultaneously press CTRL-ALT-DELETE once (only *once*; if you press it twice, you'll reboot the computer) and look in the task list. The modem-sharing software, service, or device should be shown in the list of tasks that are currently running.

Check to see whether TCP/IP (Transmission Control Protocol /Internet Proto-col) is installed on the computer(s) that cannot connect. Windows 98 usually installs TCP/IP automatically, but it could be missing, it could have been uninstalled, or it could be incorrectly configured.

Click the Start button, Settings, Control Panel, and Network. The list of network components should contain TCP/IP. If it is not listed, then you need to click the Add button and follow the prompts of the installation wizard to install it.

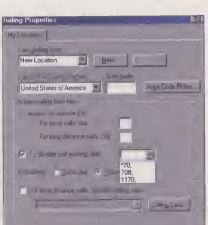
If TCP/IP is installed, click the Properties button, select the IP Address tab, and make sure that it is configured with the following settings: select the radio button for Obtain An IP Address Automatically, click the DNS Configuration tab and make sure the Enable DNS radio button is selected, under the Gateways tab, make sure the installed Gateways are blank (no gateways specified). Do not change anything else. Leave it blank, unspecified, or showing the default setting.

If you do change any settings, restart your computer to make sure the new settings take effect before you try connecting again.

You get a hardware error message when you try to connect. The modem might be turned off. If you are using an external modem, make sure it is turned on.

If you have an internal modem, it might not be seated firmly in its slot. Open the computer case, touch something outside of the case to discharge any static electricity, and press the modem firmly into its slot.

If the card is attached, the modem may be malfunctioning. You'll want to go to the Diagnostics tab in Modem Properties. Click Start, Settings, Control Panel, Modems and select the Diagnostics tab. When you get the hardware error message again, go back to the same window and click the More Info button. You'll see a dialog box detailing the port and modem settings. You'll also see details of what's wrong so you can begin fixing it.



With a dial-up connection, go to Dialing Properties to disable call waiting so you're not knocked offline every time another call comes in on your phone line.

Using ISDN, you get a no-answer message. Start by viewing the relevant instructions to ensure that your ISDN (Integrated Services Digital Network) adapters are correctly installed and configured.

The telephone number may be incorrectly configured. In some instances, both B channels of the ISDN line share one number. In others, each B channel has its own individual number. Consult the relevant documentation or contact your telephone company to find out how many numbers your ISDN line should have and how to correctly configure them.

If your ISDN requires a SPID (Service Profile Identifier) number, it may be incorrectly configured. The SPID number is usually composed of the phone number with additional digits added to one or both ends. Consult the relevant documentation or contact your telephone company to verify the correct configuration.

There may be static or noise, sometimes inaudible to the human ear, on the line. Call your telephone company or ISDN provider and ask them to check for line noise.

Online sessions are disconnecting unexpectedly. If you are using a dial-up connection and the phone line has call waiting, incoming calls will knock you offline. You can adjust your modem settings to disable call waiting while you're online. Click Start, Settings, Control Panel, and double-click Modems. Under Dialing Preferences in the Modems Properties box, click the Dialing Properties button. Under the My Locations tab, look toward the middle of the box to When Dialing From Here, locate the checkbox for To Disable Call Waiting, and put a check in the box. Type *70, 70#, or 1170 in the adjacent box, and click OK.

Your modem-sharing software, your browser, and occasionally, the remote access server you've accessed might disconnect you after a certain period of inactivity. Check the documentation for your modem-sharing software and read your browser Internet options for instructions, if any, on how to disable the disconnect-after-inactivity feature or how to extend the time period allowed for inactivity.

If you are using a dial-up connection, your Internet connection may be interrupted by something as simple as someone picking up a telephone extension in another room. This action automatically disconnects you.

Your modem cable may be loose, making only a tenuous connection that disconnects if the cable is jarred or bumped. Check and, if necessary, tighten the cable connection.

Your computer or the connection port cannot keep up with the speed you have selected. In this case, try connecting at a lower speed. Click Start, Settings, Control Panel, double-click Modems, and select the General tab. Click the Properties button, and use the Down-arrow next to the Maximum Speed box to select a lower connection speed. Then connect again and see if that resolves your problem.

Remember if you are using a client network, you must sign on as Administrator before you can change this setting. In a peer-to-peer network, any user can change it.

There may be static or noise, sometimes inaudible to the human ear, on the telephone or modem line. Call your telephone company or cable company and ask them to check for line noise.

Your modem-sharing software or modem driver might need to be updated. Check with the software and modem manufacturers to ensure that you have the most current software and/or drivers.

■ **Online Sleuth.** Chances are, by now, you've found and fixed your modem-sharing problem. If, however, you've gone through all of these steps and still cannot connect at all through your shared modem, there's a good possibility that the modem itself could be malfunctioning. If only one computer is unable to connect, you should check to see if the network card you are using, or the modem-sharing device, or even the cabling itself, is malfunctioning. Visit the manufacture's Web site to see if there are any patches or newer drivers that could solve your problem. Check the FAQ section to see if other users have encountered similar problems.

In any case, it's now time to contact the vendor or manufacturer for help. LS

by Betty Champagne Guthrie

How To . . .

Solve Common Internet Errors

Going online can be informative, fun, and useful, but it can also be frustrating. If you're running into trouble while trying to dial in to your ISP (Internet service provider) or accessing a Web site, don't despair. Here's an overview of some of the more common Internet error messages and tips for avoiding them.

Microsoft Internet Explorer
Internet Explorer could not open the Internet site
Would you like to search for this site?
Yes
No

Connection Difficulties. The first step in surfing the Web is to establish a connection with your ISP, but that isn't always as easy as it should be. A variety of problems can cause your modem to not communicate with your ISP's modem, and we'll show you how to fix some of the more common ones.

"Error 680: There is no dialtone." This error message is self-explanatory (except, perhaps, why the number "680" is assigned to it, but the origin of that naming is one of life's little mysteries), and there are a number of reasons why you might encounter it.

The primary cause is a problem with the actual physical connection. First, check that the phone line you're trying to use is actually active by plugging your telephone into the jack and making sure you can hear a dial tone.

Then, if you have voicemail and hear a "stutter" tone, remove the new messages so that the tone becomes steady again. You can also instruct your computer to wait for a steady dial tone by changing your system settings. Click Start, Settings, Control Panel, and double-click the Modems icon. With your modem highlighted, click Properties and the Connection tab. Place a check mark in the checkbox next to Wait For Dial Tone Before Dialing.

Next, check the phone cord running from the modem to the jack. Is the cord frayed or pinched? This might be keeping your modem from being able to dial out. Finally, check to see that the cord is plugged into the proper port on your computer (for internal modems) or modem (for external modems) by consulting your computer's or modem's documentation.

"Error 629: You have been disconnected from the computer you dialed." Unfortunately, this is one problem that isn't easy to pinpoint. It also is a bit misleading because being "disconnected" implies that you had established a connection in the first place, but the error message appears so quickly after initially dialing into your ISP's modem that you may not even realize a connection was established.

Begin by checking with your ISP and confirming that your account is still active and you're attempting to dial the correct phone number. You can verify and change this phone number by double-clicking the My Computer icon on your Desktop, and then double-clicking the Dial-Up Networking folder. Locate the modem connection icon and right-click it. Choose Properties from the pop-up menu. From here, you can type in the correct number in the Phone Number field. Also, make sure you're typing in the password with the correct case; most ISP's use case-sensitive passwords.

"Error 691: The computer you're dialing in to cannot establish a Dial-Up Networking Connection. Check your password, and then try again." There are two main reasons why this error message will appear. On the physical connection side, line noise or equipment failure on your ISP's end may make it impossible for you to dial in, and there isn't much you can do in this situation.

The good news is that, in most situations, you can take care of this problem immediately because it often arises when you type in an incorrect password. As mentioned above, passwords are case-sensitive, so verify that the Caps Lock button isn't activated on your keyboard.

Or, you can make it easy on yourself by configuring your system so your password is entered automatically, eliminating the need to type it in each time. To set this up, follow these three easy steps: One, double-click the My Computer icon on your Desktop; two, double-click the Dial-Up Networking folder; and three, double-click the ISP connection icon and click the checkbox next to Save Password.

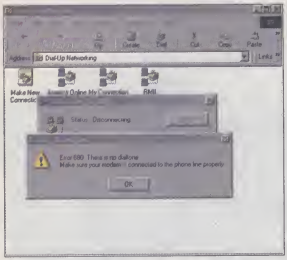
Lost connection. Once you've connected to the Internet and have been surfing the Web for a few minutes or few hours, you may suddenly find an error message alerting you about a lost connection. This message can come in several different

What You Need To Know

Benefits
Surf the Web with fewer interruptions and less frustration

Time
2 minutes to 10 minutes, depending on the task

Skill Level
Easy to Intermediate


Dial-Up Networking
Make New Connection
Error 680: There is no dialtone
Make sure your modem is connected to the phone line properly
OK

When you encounter the "Error 680: There is no dialtone" message, the first step is to check that the phone line you're trying to use is actually active by plugging your telephone into the jack and making sure you can hear a dial tone.

styles, depending upon the reason for the lost connection.

One common culprit is call waiting. If you have call waiting on the same phone line as your modem and a call comes in, it may cause your online connection to terminate. We have some instructions to fix this annoyance. First, ask your local phone company for the code to disable call waiting. Second, locate your modem's dialing properties by clicking Start, Settings, Control Panel, and double-clicking the Modems icon. Third, highlight the modem and click the Dialing Properties button. Fourth, click the checkbox next to "To Disable Call Waiting, Dial X," and then type in the code given to you by the phone company. (A typical code is *70.)

Even if you don't have call waiting, you might find that your Internet connection occasionally drops off. Some ISPs, in order to provide service to as many customers as possible while attempting to keep your subscription costs down, will disconnect you if your connection has been idle—that is, your system is logged on, but it isn't showing any online activity such as clicking links. This may happen during long downloads when your ISP might mistakenly believe your connection is inactive. Check with your ISP to find out what its policy is.

Finally, the third major type of lost connection occurs with regards to individual Web sites, not your Internet connection as a whole. For instance, suppose you're viewing your checking account online at a secure banking site. You visit another Web page and are so fascinated that you forget you're logged onto the financial site at the same time. You go back to the bank site, click a link, and are told something similar to: "Sorry, your session is no longer active." Or, perhaps you're listening to a live audio broadcast and online congestion causes your connection to the broadcast (although not the entire Internet connection) to fail. In these situations, the best solution is to log back onto the site or relaunch the broadcast.

Problems Accessing Web Pages.

Anyone who has been Web surfing for a while, or even for a short period of time, has encountered one or more of the following error messages. There are numerous causes, so we'll help you decipher some answers.

"Unable to launch application." Occasionally, your Internet connection will be fine and you'll be able to access a particular Web page, but you'll have difficulties trying to view files or other information on that same page. That's because of the way your Web browser and computer read the information presented on a Web site. Most of the sites on the Web present content that is written in HTML (Hypertext Markup Language), which can easily be displayed by a browser. But some Web site designers publish files that need a special viewer, which is software that lets you view the file in the format in which it was written. When you receive an error message that says, "unable to launch application" or "helper application not found," it means that you don't have the necessary software to view a file you're trying to access.

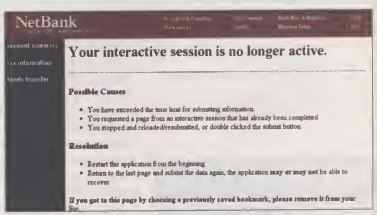
To view these files, you need to find out what format they are in and then obtain a program that can display them. One likely scenario is that the file will end in .PDF (an extension that stands for Portable Document Format), a file format developed by Adobe that facilitates the conversion of graphics-heavy documents into a form that requires the free Acrobat Reader to read. To view a PDF document, download the PDF software (assuming it isn't on your system already; it often is bundled with Web browsers) from http://www.adobe.com/products/acrobat/readermain.html.

If you can't tell by looking at the file what plug-in application it uses, contact the Web site administrator to find out where and how to obtain the appropriate software.

"Security Alert." Internet Explorer users may run into this error message, which is generated by the browser when you try to visit a site or access content on a site that your browser labels as "potentially unsafe."

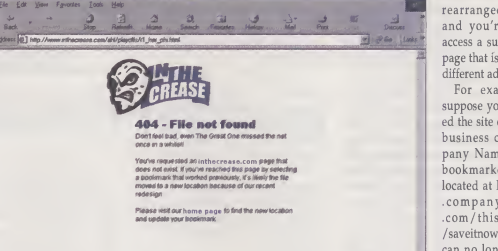
Internet Explorer lets you categorize sites into four security levels: low, medium-low, medium, and high. The default value is set at medium, and if you're using that setting and you try to register at or download a file from a remote site, for example, you may see some type of security alert message. It will say: "When you send information to the Internet, it might be possible for others to see that information. Do you wish to continue?," or it might warn you not to download files unless you are sure they are safe. These aren't really error messages; they are merely warnings.

If your security settings are on high, however, you may be prohibited from downloading


NetBank
Your interactive session is no longer active.
Possible Causes
You have exceeded the time limit for submitting information.
You requested a page from an interactive session that has already been completed
You stopped and reloaded/resubmitted, or double clicked the submit button.
Resolution
Restart the application from the beginning.
Return to the last page and submit the data again, the application may or may not be able to recover

Some individual companies, especially financial ones, will disconnect your online session with their site (but won't sever the entire Internet connection) when you are idle for a few minutes.

files, and you'll see an error message such as: "Your current security settings do not allow this file to be downloaded." To change your security settings (in most cases we recommend that you set them to medium) choose Internet Options from your IE Tools menu and select the Security tab. Click the slider to move it to Medium, which lets you see most sites and only displays a warning before you attempt to download third-party files.


404 - File not found
Don't feel bad, even The Great One missed the net once in a while!
You've requested an inthecrease.com page that does not exist. If you've reached this page by selecting a bookmark that worked previously, it's likely the file moved to a new location because of our recent redesign
Please visit our home page to find the new location and update your bookmark.

Most "404 Not Found" error messages, which indicate that a Web page is unavailable, are fairly dull, but here's a humorous one to liven things up.

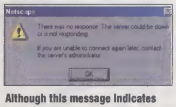
"Cookie not read" or "Cookie not set properly." Cookies, for those of you unfamiliar with them, are bits of code that a Web site will place on your hard drive so it can remember something about you later. For instance, sites may keep track of advertising banners they have presented to you. Depending on how your browser is configured, you may receive a warning before a cookie is sent to your machine, or you may not be able to access a site at all because cookies have been disabled.

You can change your cookie settings by reconfiguring your Web browser. If you're using IE, click Tools, Internet Options, and select the Security tab. After clicking the Custom Level button, scroll down the list until you see the area about cookies, and click the button next to Enable, Disable, or Prompt. (If you can't access a site because of the "cookie not read" or "cookie not set properly" error message, you'll want to set your browser to either "enable" cookies or "prompt" you before opening the site.) Netscape Navigator users will find the cookie settings by opening the Edit menu and choosing Preferences. Double-click the Advanced menu listing, and choose the desired setting.

JavaScript or ActiveXScript errors. JavaScript is an interpreted programming or script language that developers use to add snazzy features to Web sites, such as animation. As you're opening a site, you might see a message similar to: "Sorry, your browser doesn't support JavaScript (Netscape users) or ActiveX Script (IE users). It is necessary to activate these features in order to view 100%. Make sure that JavaScript or ActiveX Script are enabled in your browser, then try again." This message means that your browser is configured so that it won't interpret this code.

The cure is simple. IE users will find these settings near the cookie settings. Again, click Internet Options from the Tools menu and select the Security tab. After clicking the Custom Level button, scroll down the list until you see the area pertaining to Java. Under Java Permissions, choose a button other than "disable Java," such as "medium safety." Navigator users will need to open the Edit menu and select Preferences. Then, after double-clicking Advanced, place check marks in the boxes next to Enable Java and Enable JavaScript.

"404 Not Found." You are a rare person indeed if you've never encountered the common "404 Not Found" error message. This message pops up when you type a URL (universal resource locator, a Web address) or click a link, but there's no matching Web page, perhaps because the site has been rearranged or you simply mistyped the URL.


Netscape
There was no response. The server could be down or is not responding.
If you are unable to connect again later, contact the server's administrator.
OK

Although this message indicates that a Web page is unavailable, it also tells you the problem is probably temporary.

To solve this problem, first look at the URL you typed. Have you included an extra character, such as typing a URL that ends in "htm" with "html" instead? If you didn't type the address yourself, did you bookmark the site a month ago? It's worth a shot to see if the site has rearranged its pages and you're trying to access a supplementary page that is now using a different address.

For example, let's suppose you once visited the site of a fictitious business called Company Name, and you bookmarked the page located at http://www.companynamehere.com/thispageiscool/saveitnow.html. If you can no longer see that page, try going to the home page at http://www.companyname.com. If that page exists, look for a link to the exact supplementary page title.

"Server does not have a DNS entry" or "Browser is unable to locate the server." As with the "404 Not Found" message, this error message might appear in a pop-up window when you type in a URL or click a link and there's no matching Web page. But in this case, the message tells you the entire site is missing, not just a page. So, to follow along with our previous example, if you attempt to visit Company Name's page at http://www.companynamehere.com/thispageiscool/saveitnow.html, and then you see this message, you won't be able to access its home page at http://www.companynamehere.com, either.

In most cases, this is simply because the individual site has been removed, and unfortunately, there isn't much you can do to change that. You can try searching for Company Name using your favorite search engine to see if it merged with another company and changed its URL in the process. But if you're getting this message with every site you're trying to visit, the problem could be with your Internet connection, so try to log off and log onto the Internet again to see if that helps.

"Server down" or "No response, server not responding." While the end result with this message is the same as with the

above two error messages (you can't access a particular page or site), the message is a bit more encouraging because at least your browser knows a particular site exists. What it can't tell you is why (maintenance? hackers?) the site is temporarily unavailable.

One solution is to check back with the site in a few minutes or hours later. Another potential solution occurs when you have visited the site previously. A copy of each Web page you visit is stored (also called cached) on your hard drive, and it remains there until either you clean it out manually or your system's automatic program for deleting cached files kicks in. If you are asked whether you'd like to see a cached version of the page, remember that the page may have changed since it was last saved to your system.

"400 Bad Request." Given the fact that this error message has a precise number, you might think it applies to a precise situation. Unfortunately, the "400 Bad Request" message covers a lot of ground and could arise in a number of situations. Perhaps you typed in a URL that doesn't exist; check the spelling, including upper case and lower case letters, for typographical errors. Maybe the server is down temporarily (as in the case of the "server not responding" message), so try the site again later. Or, if you think the page exists but you haven't been able to access it for some time, try contacting the Webmaster or site administrator if you have access to that information.

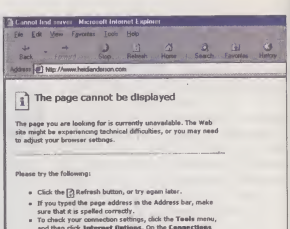
"401 Unauthorized." This error message, on the other hand, is quite straightforward. When you attempt to access a site for which you have no permission, you may see this warning. Often Web pages, particularly those belonging to internal company departments such as human resources, require users to enter a password or access the site from a particular domain, which is the group (large or small) of connected computers that are joined on TCP/IP (Transmission Control Protocol/Internet Protocol) networks.

Those who don't have the proper password or other necessary authorization will often encounter this "401 Unauthorized" error message. Limit this occurrence by retyping the password to double-check its accuracy or contacting the Web site administrator.

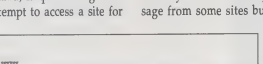
"403 Forbidden." Along the same lines as the previous error message, "403 Forbidden" is letting you know you are forbidden from accessing a Web page for many of the same reasons you can't see the "401 Unauthorized" pages. If you believe you have the proper password, try typing it again after ensuring that the Caps Lock button is not engaged on your keyboard.

"503 Service Unavailable." Here we go again. "503 Service Unavailable" is another error message that has a wide range of interpretations. While this message alerts you to the fact that you can't access a site, the underlying explanations are manifold.

One, the site's server might be down. Two, the connection between you and the remote server might be down. Three, your ISP might just be having difficulties. As with several other error messages, one often-successful approach is to wait for a few minutes and see if the message disappears. If that doesn't clear up the error, call your ISP to find out whether they are reporting any problems. And if you're consistently receiving this message from some sites but can access others, it could simply be that the Internet network is having trouble in a particular region, perhaps due to weather, so continue trying to access the site again during periodic intervals.


Cannot find server - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History
Address http://www.heidianderson.com
The page cannot be displayed
The page you are looking for is currently unavailable. The Web site might be experiencing technical difficulties, or you may need to adjust your browser settings.
Please try the following:
Click the Refresh button, or try again later.
If you typed the page address in the Address bar, make sure that it is spelled correctly.
To check your connection settings, click the Tools menu, and then click Internet Options. On the Connections tab, click Settings. The settings should match those provided by your local area network (LAN) administrator or Internet service provider (ISP).
If your Network Administrator has enabled it, Microsoft Windows can examine your network and automatically discover network connection settings. If you would like Windows to try and discover them, click Detect Network Settings.
Some sites require 128-bit connection security. Click the Help menu and then click About Internet Explorer to

Specific to Microsoft Internet Explorer, this message displays within the browser window in a variety of situations.


400 Bad Request
Request cannot be handled by the server
Reason: Connection with Host header containing unknown local host name "www.6308new.com" Received on IP address 205.149.37.151, which is not bound to any virtual server Cannot proceed

When you see the "400 Bad Request" message, it might mean that the Web page or site you're trying to access doesn't exist.

"Host unavailable" or "Host unknown." The two messages look the same, but they don't necessarily appear on the same occasions. "Host unavailable" is easier to deal with. It typically means you typed the URL correctly, but the **host**, which is the computer that shares information with other computers (such as a Web server), is offline for a period of time.

One common cause could be that the Webmaster is working on the site and the page will be uploaded and online soon, so check back later. Or, you may be able to view the page simply by using your Web browser's Refresh or Reload command.

The "Host unknown" message may mean the same thing as "Host unavailable," but it also might display in your browser window when the Internet connection is lost. Try the aforementioned procedures, and then try logging off and logging back online again.

"The page cannot be displayed." This error message is specific to IE, and you'll see it display within the browser window in a variety of cases. IE tells you that: "The page you are looking for is currently unavailable. The Web site might be experiencing technical difficulties, or you may need to adjust your browser settings," and then lists a number of possible solutions. We'll walk through them here.

One, click the Refresh button in an attempt to reload the page; perhaps the remote machine hiccupped while trying to communicate with your computer. Two, check the URL in the Address field to make sure it is spelled correctly. Three, run through your connection settings (click Internet Options from the Tools menu, choose the Connections tab, and click Settings) with your ISP to make sure the values match. Four, check with the Webmaster to see if you have sufficient security settings. LS

by Heidi V. Anderson

How To . . .

Diagnose Download Problems

One of the best things about the Internet is that you can do much more than just browse the Web. Many sites allow you to download documents, applications, hardware drivers, program updates, music clips, and trial software stored on file servers.

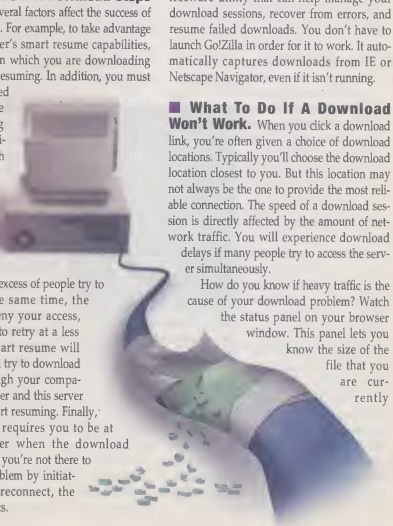
Current versions of Microsoft Internet Explorer and Netscape Navigator are very "smart" when it comes to downloading software. If you encounter a download link, simply click the link. Select a location to store the file, then click OK. The download begins. Wait for the download to complete.

If the download session aborts in midstream, you won't have to start the process from scratch. When you're back online, return to the original download site, click the same download link, and save to the identical location on your hard drive. Both IE and Navigator will determine that you have already downloaded part of the file. Each browser knows how to resume the download right at the point where the connection dropped, appending the rest of the data to the end of the partially stored file.

■ What To Do If A Download Stops Midway.

Several factors affect the success of a smart resume. For example, to take advantage of your browser's smart resume capabilities, the server from which you are downloading must support resuming. In addition, you must have authorized access to the server storing the file or application you wish to download.

Smart resume will only work if you aren't experiencing network errors. When an excess of people try to connect at the same time, the server may deny your access, requiring you to retry at a less busy time. Smart resume will not work if you try to download software through your company's proxy server and this server does not support resuming. Finally, smart resume requires you to be at your computer when the download attempt fails. If you're not there to correct the problem by initiating a manual reconnect, the download aborts.



If all conditions are perfect but you don't want to wait for a download to complete, there are several cost-free solutions to automate the download process.

For example, you could download and install a freeware utility called Dunce. Designed by Vector Development (http://www.vecdev.com/dunce.html), Dunce (an acronym for Dial-Up Networking Connection Enhancements) is an add-on to Windows 95 Dial-Up Networking that will redial your ISP (Internet service provider) as often as necessary to establish a connection.

It also works with Windows 98. It includes support for redial even when the Win9x internal redial won't work and support for the connection scheduling. Dunce also has the ability to reconnect your computer in the event of a disconnect and to enter your password automatically.

You could beef up downloading capabilities even more by teaming Dunce with Aureate Media's Go!Zilla (http://www.gozilla.com), a freeware utility that can help manage your download sessions, recover from errors, and resume failed downloads. You don't have to launch Go!Zilla in order for it to work. It automatically captures downloads from IE or Netscape Navigator, even if it isn't running.

■ What To Do If A Download Won't Work.

When you click a download link, you're often given a choice of download locations. Typically you'll choose the download location closest to you. But this location may not always be the one to provide the most reliable connection. The speed of a download session is directly affected by the amount of network traffic. You will experience download delays if many people try to access the server simultaneously.

How do you know if heavy traffic is the cause of your download problem? Watch the status panel on your browser window. This panel lets you know the size of the file that you are currently

What You Need To Know

Benefits
Learn how to optimize a download session and how to recover from download errors. Discover utilities that can help automate or improve download capabilities.

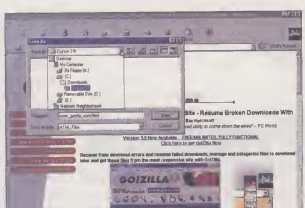
Tools
The current version of a popular browser; Go!Zilla's free download manager; Vector Development's free Dunce Win 95/98 add-on Dial-Up Networking utility; PKWare's PKZIP or WinZip Computing's Winzip to decompress downloaded files that do not come with built-in self-extractors

Time
Varies

Skill Level
Intermediate

Cost
PKZIP, $29 if downloaded ($39 for disk version); WinZip, $29 if downloaded

downloading. If the information in the status panel doesn't change for about 10 to 15 seconds, the download has stalled. On other occasions, when there's a download problem, you'll see an error message pop up on-screen. For either problem, stop the download currently in progress, then try downloading a second time. If the delay persists, or the error message pops up again, select a different download location. You can choose any download link, regardless of your location or the location of the Web/FTP (File Transfer Protocol) server hosting the software.



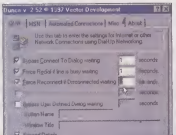
When a file appears to download but you can't find it, click your browser's File/Save As command a second time to locate the folder you selected for the previous download.

If you install Go!Zilla and initiate a download, the software will search for mirror download sites as long as you have enabled the Auto FTP Search option. Once Go!Zilla locates download site alternatives, it will quickly test them all to see which one is operating at the fastest speed, and then it will connect to that server and initiate the download.

■ **Missing Files?** When a file appears to download but you can't find it, don't panic. If your browser is still running, click File/Save As a second time. When the Save As dialog box appears, it will automatically open to the same folder you selected for the previous download. Make a note of the folder listed in the Save In field at the top of the dialog box, then click the arrow to the right of the Save In field to identify the path to this folder. Click Cancel once you've made a note of the path.

If that doesn't work, click Start, Find, Files Or Folders. If you know the name of the downloaded file, enter that name in the Named field; make sure Look in: reads drive C: (or the drive you used for the download). Be sure that the Include subfolders option is selected. Click Find Now. Windows will display a list of search matches. With any luck, one of them will be the file you seek.

If you don't know the name of the file, click the Date tab in the Find: All Files dialog box and click the Find all files option. Select Modified from the drop-down list, then click the During the previous option. Specify a date range. Click Find now. Click the horizontal scroll button in the window containing the list of matches. Scroll this window until the Type column becomes visible. Click Type to sort window contents by file type. Scroll the list to locate the item that you downloaded.



Vector Development's Dunce is an add-on to Windows 95/98 Dial-Up Networking. Dunce will redial your ISP as often as necessary to establish a connection.

If the downloaded file is an application that requires installation, exit the browser, exit all currently running applications, navigate to the folder containing the application, then double-click the application icon to run setup.

To minimize the possibility of losing future downloaded files, it's best to store each downloaded file or application in its own folder in a Downloads directory. To create such a folder in Windows, right-click anywhere on a blank part of the Windows Desktop, point at New, and click Folder. A new folder appears on the Desktop. Name the folder Downloads.

Double-click My Computer. Your goal is to drag the Downloads folder from the Desktop into drive C:. Drag Downloads into My Computer, Double-click Drive C: to open it. Scroll the list of folders until you see Downloads. Right-click Start and click Open. Position the Start Menu window so that you can still see the Downloads folder on Drive C:. Click the Downloads folder with the right mouse button. While holding the button drag Downloads into the Start menu window. Release the mouse button, and choose Create Shortcuts Here. This will place a shortcut to the Downloads folder in the top portion of your Start menu so it's easy to find after each new download.

The next time your browser asks where to save the file you want to download, navigate to C:\Downloads.

■ **Username & Password.** If you get prompted for a username and password when you try to download a file, it simply means that you've logged on to an anonymous FTP server. Before this server will let you download what you want, you must log on with the standard username and password it expects. Enter anonymous for username and your e-mail address for the password. Usually, your browser will handle this request automatically. If you receive this message often, verify that you have configured your browser so that it knows your e-mail address.

■ **The Downloaded File Won't Decompress.** Most downloaded programs arrive in compressed format. This saves download time because the smaller the file size, the less time it takes to copy to your computer. Compressed PC files typically have a .ZIP extension. If you download a compressed program, copy it to an empty directory. (Give this directory a descriptive name that will identify the download file.)

After download completes, double-click the compressed file to extract its contents, then follow directions to install it. If the download file doesn't come with a built-in self-extracting applet, visit PKWARE (http://www.pkware.com), then click the link to PKZIP for Windows. PKZIP is free to try (shareware), but costs $39 for the diskette version and $29 for electronic delivery. Alternatively, visit WinZip Computing (http://www.winzip.com) to download an evaluation version of WinZip, a robust and friendly PKZIP-compatible application ($29). LS

by Carol S. Holzberg, Ph.D.

How To . . .

Solve Problems With Web Page Downloads

We've all experienced it at one time or another: that stubborn Web page that refuses to load. Some people ignore it, hoping the problem will go away on its own; others worry they did something wrong. The rest blithely blame the site, secure in the knowledge that if the Web developers weren't such idiots, this would never happen. All these responses are correct at one time or another, but none of them solve the problem of getting the Web page to load.

■ **Error Messages.** Understanding any displayed error messages can be a big help. Basic Web server status messages are in groups: the 400 and 500 series of codes.

400 series (client error). You receive these errors when your browser makes a request the server cannot fulfill or understand. The most well-known error in the 400 series is 404, File Not Found. When you see this code, check the Web address you entered. Make sure you correctly spelled it and that there aren't any extra spaces, characters, or slashes. If everything is correct, remove the last directory from the Web address. (Directories are defined by slashes.) For example, if you are trying to access http://www.yourfavoritesite.com/articles/september, remove the last directory so the address reads http://www.yourfavoritesite.com/articles. If this page successfully loads, look for a link to the page you were originally trying to access. If necessary, back all the way up to the root domain (http://www.yourfavoritesite.com) and then check the site's links for the desired information.

500 series (server error). The most common 500 series error is 503, Too Many Requests Pending. Because all 500 series codes indicate some type of server error, there is not much you can do except try the site again. Clicking your browser's Reload or Refresh button will often load a stubborn page. If not, try the site again later, at a time that is less busy; too much site traffic causes many 500 series errors.

■ **Other Error Messages.** Other error messages you may encounter include:

The Handle Is Invalid. Your browser is unable to work with a newer CGI (common gateway interface, the standard for passing data between a server and an application on the Web) script. To correct the problem, upgrade your browser to the most recent version.

File Contains No Data. This occurs when you access a page, but the file that should contain the page data is empty, usually because the site is being updated. Try the site again later.

Host Unavailable. The host system is down. Try again later.

Host Unknown or Unable To Locate Host. The host server is down, the Web address is incorrect, or the Internet connection was lost. Check the address, make sure you're connected to the Internet, and then access the page again.

Network Connection Was Refused By The Server. The server is overloaded with requests and is unable to handle all of them. Try again later.

Unable To Connect To Server. This occurs for a number of reasons, including excessive traffic at the server or on any of the Internet routers between you and the server. A server problem also can cause this error. Click Reload or Refresh on your browser. If that doesn't work, try again later.

■ **Blank Pages.** Sometimes a page seems to load correctly, but it displays little or no information. Many sites use optional Web technology, particularly Shockwave, Flash, Java, and JavaScript, to extend the capabilities of a page. Shockwave and Flash (http://www.shockwave.com) are free, optional plug-ins for your browser. If you don't have these plug-ins, and a site requires you to have them to correctly view its pages, you'll see a message that a plug-in is required to view the page and probably a link to a site from where you can download it.

Java and JavaScript are built into most new browsers. However, in most cases, you can turn these features off at will, causing problems when you try to access sites that make use of them. You can turn Java and JavaScript on or off in your browser preferences.

■ **Quick Fixes.** If you are still having problems, here are two more quick fixes to try.

- Your browser keeps copies of pages you visit. This can speed up page loading, but it also can display an out-of-date page. To fix this problem, delete your cache and history from your browser preference settings.
- If you access an out-of-date page and the site has a search function, try searching for the missing page.

As a last resort, call your ISP and ask it to try the Web address. It may have undiscovered problems with its Internet router. In addition, if you can find an e-mail address for the site you are trying to access, send the Webmaster an e-mail message about the problem. LS

by Tom Nelson and Mary O'Connor

What You Need To Know

Benefits
Crack the secret code for some common Web page error messages, and you'll get more satisfaction out of your browsing time

Tools
Familiarity with your browser preferences is helpful but not required for most tasks

Time
5 minutes or less

Skill Level
Easy to Intermediate

How To . . .

Fix A Hyperlink That Won't Work

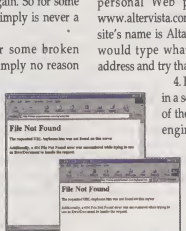
Imagine this: You've been searching the Web for something, and you finally find a link to a site that sounds like it has just what you want. You click the link and wait, only to be confronted by an error message. While it may seem like all is lost, don't despair. There is often a simple reason why a hyperlink doesn't work, and the problem can usually be fixed, if you know how.

To fix a broken hyperlink, it helps to know two things about it: where the hyperlink came from and something about the error it triggers in your browser. Hyperlinks that you find in search engine results and online directories such as Yahoo! are more reliable because they're not typed by hand; instead they're located or verified by a computer. The chances that a simple typographical error caused your broken link are slim. On the other hand, on a personal or business Web site, typographical errors are high on the list of reasons why a link doesn't work.

The type of browser error can also tell you something about the problem. If you're using Netscape Navigator and see a message saying Netscape Is Unable To Locate The Server, this means that the site itself can't be located. However, a 404 File Not Found error tells you the site was located but the actual page cannot be found. The implications for you finding what you are looking for are different in each case.

You should also understand that the Web is in a constant state of change. Web pages that were here today may not be tomorrow—they may be in a different place or removed altogether and impossible to trace. Also, not only pages, but entire Web sites can disappear overnight, never to be seen again. So for some links that don't work, there simply is never a solution for fixing them.

Another explanation for some broken hyperlinks is that there is simply no reason they don't work. If you press the Back button on your browser and click them a second time, they'll often work perfectly. Also you may find that a server that appears not to exist one day can be located easily another day or time. It may be that the server is down for maintenance or is experiencing problems at the very time you click the hyperlink, resulting in an error message. Later on, when the site's server is back up and running, the link will work perfectly.



When you encounter a broken hyperlink, don't give up. It's possible you can fix the problem and find the page you're looking for.

Here's a step-by-step approach to fixing hyperlinks:

1. Press the Back button on your browser and try the link again.

2. If you receive a 404 File Not Found error, remove everything from the right side of the address in your Address bar up to the first forward slash (/) symbol (not including http://) and press ENTER. If you still encounter an error, repeat this step and continue removing pieces of the address.

If you are successful in loading a page from the site, it probably won't be the one you're looking for. However you'll be on the site that contained the page so you may be able to find it by hunting around.

3. If it appears that the server itself can't be found, check to see if it is possible there is a typographical error in the Web address. For example, a link to AltaVista on a company or personal Web page that is written as www.altervista.com has an obvious error—the site's name is Alta not Alter. In this case, you would type what you think is the correct address and try that.

4. If you encounter a broken link in a search engine's results, try one of the other links that the search engine provides. For example there may be a More Pages From This Site link or a Related Pages link. When you click these links, you may find other similar or alternative pages from that site or another.

5. If none of these steps work and the link is on a personal or business Web site, use the information you have about the page to look for it using a search engine such as AltaVista (http://www.altavista.com) or HotBot (http://www.hotbot.com).

6. If the link is on a business or personal Web site, e-mail the Webmaster or site owner and tell her the link you're interested in is broken and ask her if she knows the correct or new address.

7. If all else fails, try the site at another time, perhaps later in the day or on another day or week. We've checked a particular broken link for a month or two and been rewarded for our patience, so if it's that important to you, patience may pay off. LS

by Helen Bradley

What You Need To Know

Benefits
Overcome the frustration of finding what looks like a great link and encountering an error instead.

Time
A few minutes

Skill Level
Easy

How To . . .

Troubleshoot Online Music

While music may soothe the savage beast, the average computer user feels anything but soothed when faced with balky online music Web sites, media players that won't play, and sound cards that won't output any sound. You can overcome most problems with a little troubleshooting. For all of the tips in this article, you must have an open Internet connection (either dial-up or broadband) running first.

Get the right player. One of the many complicating factors about online music is the presence of multiple standards for online media. The pioneer was Real Networks' (originally Progressive Networks) Real Audio, which has now morphed into the audio/video RealPlayer, but a popular rival is Microsoft's Windows Media Player. Here's what to do if you have only one of these players installed and you need to install the other one.

Problem #1: You want to listen to online music and the music is in RealPlayer format, but you don't have RealPlayer installed.

1. Most sites that offer RealPlayer-format media have a link to the Real Networks' Web site so you can get a player. Click the Get RealPlayer button if it's available.

2. If you must navigate to the site yourself, enter this URL (universal resource locator) into your browser's address window: http://www.real.com.

3. When you reach the Real Networks' Web site, you'll be bombarded with offers for RealPlayer Plus. If you just need basic RealPlayer capability, scroll down toward the bottom of the screen to locate the link for downloading free RealPlayer Basic (version 8 at the time of this writing). You'll need to navigate through several screens, and you will need to register before you can download a free version of RealPlayer.

4. Once you install the RealPlayer, you'll be able to listen to RealPlayer content online.

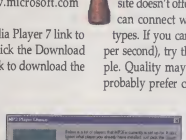
Problem #2: You want to listen to music online, but your favorite sites offer music in Windows Media Player-compatible formats only.

1. Most sites that offer Windows Media-format music offer a button to take you to the Windows Media Player Web site. If not, use this URL: http://www.microsoft.com/windows/windowsmedia.

2. Click the Windows Media Player 7 link to go to the download page. Click the Download Windows Media Player 7 link to download the Media Player.

3. The latest version of Media Player, 7.x, is only for Windows 98 and Windows 2000. (Windows Me includes it.) This is the default selection. If you have Windows 95 or another operating system, open the menu to select your OS and player.

4. Select language and click Download Now to start the process.



MP3.com's MP3Fix program lets you make any MP3 player on your system the default.

5. After you download the appropriate version of Media Player, install it.

With both RealPlayer and Windows Media Player, you're ready to handle virtually any type of Internet music content.

Get connected. One of the best reasons to install both RealPlayer and Windows Media Player is that many online music sites support both formats. If you are unable to connect to a particular online music site using your favorite player, use the other player as a backup. Right now, more online music users seem to prefer RealPlayer, so you are more likely to find that a popular site may not let you to log on with RealPlayer but may let you log on with Windows Media Player (because of limits placed on the number of simultaneous users with a particular player).

What are the signs that you need to try a different player or connection?

- Error messages indicating that the server cannot accept any more connections (Server Too Busy).
- The music starts and stops frequently because the site cannot keep the player's buffer full.

Try a different connection rate. If a site doesn't offer a different music format you can connect with, try different connection types. If you can't connect at 56Kbps (kilobits per second), try the 28.8Kbps stream, for example. Quality may be slightly lower, but you'll probably prefer continuous music to annoying starts and stops.

Report errors. If the station displays a feedback form after an error message, be sure to fill it out and submit it, because the station may be able to suggest solutions to help you connect the next time.

Connect early. If you are trying to connect to a live broadcast with a popular artist or group, connect

What You Need To Know

Benefits
Enjoy online broadcasts and MP3 downloads of your favorite music; make your computer into a stereo

Time
5 minutes to an hour or longer

Skill Level
Easy to Intermediate

Easy to Intermediate

Cost
$$$
Free for basic players. Advanced versions of RealPlayer and some MP3 players cost up to $30

early, even before the actual concert starts, if possible. Otherwise, you may not be able to get on.

If you cannot connect with any player. Make sure you are using an up-to-date browser. BroadcastAmerica.com and many other sites use Java scripts for displaying stations and making your connection. An out-of-date browser, or, with Microsoft Internet Explorer, an out-of-date Virtual Machine setup, can cause you not to connect, even if your player is configured correctly. (See below.)

Download and install the latest version of your browser, then reinstall your favorite player.

Fix RealPlayer connection problems. If you can't make connections with RealPlayer content at work but have no problems at home, you may need to adjust the Transport and Proxy Server settings in your work computer's RealPlayer program.

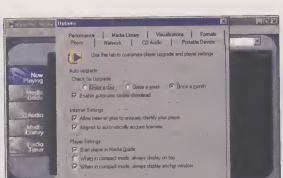
To adjust these settings in RealPlayer:

1. Open RealPlayer.
2. Click View.
3. Click Preferences.
4. Click the Transport tab to make the adjustments listed below.
5. Click the Proxy Server tab to make the adjustments listed below.
6. Click OK to finish.

Troubleshoot RealPlayer proxy settings. Proxy settings refer to a proxy server, a computer that many networks use as a midpoint between your computer and the Internet. RealPlayer assumes a direct connection unless this screen is configured with information for your network. To see if you need to use this screen, consult your network supervisor.

If you use a proxy server setting for your Web browser, enter the same setting into the HTTP (Hypertext Transport Protocol) proxy field of RealPlayer's Proxy menu. If the name of your proxy server has changed since you set up RealPlayer, this can cause your connection to fail. Type in the name of your proxy server and its TCP (Transmission Control Protocol) port address (usually 80) and click OK. Try your connection again.

Troubleshoot RealPlayer transport settings. If you can connect to the station after you correctly enter the proxy server settings, but you get an error that mentions using an incorrect transport protocol, you can have RealPlayer try other transport methods. This hap-pens automatically if you ask RealPlayer to try other transport options, or you can select the AutoConfigure option in RealPlayer's Trans-port menu.



Windows Media Player 7 can check for updates automatically.

After RealPlayer determines the correct settings, you can view those settings in the Transport menu.

To retry your connection after you change the Proxy or Transport settings, click in the address line of the RealPlayer window and press ENTER.

Troubleshoot Windows Media Player settings. Because Windows Media Player is closely tied to the Microsoft Internet Explorer browser, by default Windows Media Player picks up IE's proxy settings. You're less likely to need to adjust the Media Player's default settings. However, if you do need to make adjustments, follow this procedure with Windows Media Player:

1. Start Windows Media Player.
2. Click View, Settings, Windows Media Source Filter.
3. If you can't connect, check the following:

- Check marks should be next to Multicast, UDP, TCP, HTTP.
- If your network ad-ministrator specifies a port for UDP, put a check mark next to Use Port and enter the correct port number
- For HTTP, make sure that Use Browser Proxy Settings is selected if you use proxy settings in your browser. You can also set up your own proxy settings or set HTTP to use no proxy.

4. Click OK.

Play MP3s online. MP3 is the controversial music format that's taken the music world by storm, and many online music sites feature MP3 content you can download for play later or listen to live. If you have either of the "big two" media players, RealPlayer or Windows Media Player, you can listen to MP3 files.

Fix MP3 file association problems. Keep in mind that when you install an additional MP3 player program, it will normally take over your previous player's association with MP3 files, becoming the default MP3 player. There are several ways to overcome this problem.

When you install a new media player, use the Custom installation option. This option will often let you select which types of files will automatically load the media player when you open them. Deselect the .MP3 file extension, and your current program will continue to work with MP3 files.

If you have already installed the new MP3 player and want to reassociate the previous player with MP3 files, an easy way to do this is to download and run the MP3Fix program available from http://help.mp3.com/help/diagnosis/index.html.

This program will display the available MP3 players already installed on your system and let you select the player you want as the default for use with MP3 files.

Fix your media player. It's not unusual for new programs to have problems. If you have the new Microsoft Windows Media Player 7, you can use its automatic self-updating feature or force it to check for updates on-demand.

To adjust the interval for automatic updates:

1. Start the Media Player.
2. Open the Tools menu.
3. Select Options.
4. Select the Player tab.
5. Select daily, weekly, or monthly updates.
6. Click OK to save the changes.

To force the Media Player to update itself immediately:

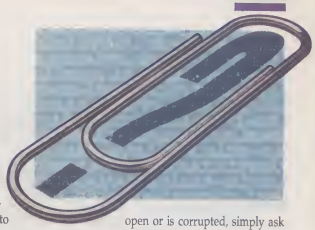
1. Start the Media Player.
2. Select the Now Playing button.
3. Open the Help menu.
4. Select Check For Player Updates.
5. Select the update(s) you want from those listed.
6. Click Next to download and install them.
7. Restart the computer.

With older versions of Media Player, RealPlayer, and other media software, download and manually install the latest editions or fixes. LS

by Mark Edward Soper

How To . . .

Work With E-mail Attachments



It's a real bonus to be able to share files and even photos with friends and co-workers via e-mail. In most cases, you simply create the file and attach it to your message using your e-mail software's attach file option. On the other hand, when you receive an attachment, you view it simply by clicking its name or icon in your e-mail software. But what happens when the system fails and you can't send attachments or read the ones you get? There are myriad reasons why the process may fail; here are some of the more common ones and their solutions.

■ **Sending Attachments.** When an e-mail message with an attachment is returned to you marked undeliverable or simply never arrives in the recipient's e-mail inbox, check the size of the attachment. Most e-mail servers won't let users receive attachments larger than 2MB (megabytes); 1MB is a recommended maximum. If you're trying to send multiple large files as attachments to a single e-mail message, don't. Instead, send them individually by creating one e-mail message for each attachment.

If you're only attaching one large file to an e-mail message, you can reduce its size to more acceptable levels by compressing the file into a .ZIP file using software such as WinZip (http://www.winzip.com). Attach the .ZIP file to your e-mail message, and your recipient can use WinZip (or a similar tool) to unzip the file into its original state. "Zipping" files, as this process is often called, is also the recommended way to send multiple files as a single attachment.

When your recipient receives your attachment but can't view it, there's a good chance that you're sending a file in a format their computer can't read. This generally happens because they don't have the same software as you. Find out what software you both share; if you're sending a WordPerfect word processing document, for example, ask them what word processor they use. You can usually save your documents in a format compatible with their software if you choose File, Save As and, from the Save As Type drop-down list, choose the program they're using. Alternately ask them what formats their software can read and save your file in one of those formats. The best choice for text is often a universal format such as rich-text format (.RTF files) or text-only format (.TXT), which is readable by nearly everyone but eliminates document formatting such as italics.

■ **Receiving Attachments.** A similar problem arises when you receive an e-mail attachment you can't read because you don't have the same software the sender used to create it. Ask senders what formats their programs can save files in, then see which of these your software will accept and use these formats for exchanging documents.

If you receive an attachment in a format your computer can read but the file won't open or is corrupted, simply ask the sender to resend it. This will happen occasionally, and there is little you can do to fix the problem.

Often, when you can't open an attachment simply by clicking it, you can still open it in another program. Save the attachment to disk, rather than trying to open it from within your e-mail software, and load the program you want to use to open the file. Now use File, Open to open the file itself.

If, instead of an attachment, you receive a message full of miscellaneous meaningless characters, it may be an attachment encoded using **uuencode**. Uuencoded files use only basic characters, making them a reliable way to transfer data among users. From your e-mail software, save the e-mail message using File, Save As. Choose a plain-text file type and give it the extension .UUE. Now open WinZip (or another program capable of decoding uuencoded files), open the .UUE file, and proceed to decode its contents.

■ **E-mail From Mac Users.** If you receive an attachment from a Macintosh user, you may find that the compression format they used is incompatible with a program such as WinZip. In this case, try downloading the free Aladdin Systems' Aladdin Expander for Windows (http://www.aladdinsys.com/expander/index.html), which will open most Mac files.

Another common problem with Mac attachments stems from the Mac's different approach to file names. PCs expect files to have a three-character extension indicating the file's type; that's not the case on the Mac. If you know, for example, that you've received a Microsoft Word file from a Mac user, rename the file with the extension .DOC (the Microsoft Word extension used on Windows computers) and try opening it in Microsoft Word. LS

by Helen Bradley

What You Need To Know

Benefits
Share documents, images, presentations, and more with other users via e-mail.

Tools
Required: e-mail software, an e-mail account, and an Internet connection.
Recommended: WinZip.
Optional: Aladdin Systems' Aladdin Expander for Windows

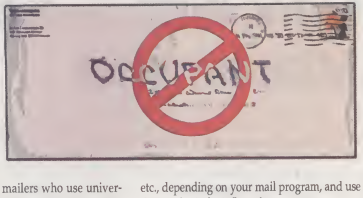
Time
About 5 minutes

Skill Level
Easy to Intermediate

Cost
WinZip 8 costs $29 (single user) to register

How To . . .

Stop Spam



Spam arrives in the inboxes of millions of recipients every day. Often referred to as electronic junk mail, spam enjoys equal doses of love and hate depending on which side of the fence you're on. Companies and entrepreneurs who want to advertise see spam as a way of reaching masses of potential customers. Users who just want to read their important e-mail don't want spam jamming up their mailboxes. Since current laws do not provide protection from spam in e-mail, you're on your own when it comes to dealing with it.

The uproar about spam stems from the fact that it costs its recipients time and money, it clogs valuable bandwidth on communication networks, and it wastes valuable space on host and personal computers. Spammers hog up bandwidth that doesn't cost them anything, using valuable resources that other people need. When your ISP (Internet service provider) stores your mail, spam takes up valuable space, possibly filling your inbox and causing important mail to be turned away.

Spamacide. To add insult to injury, spammers often buy their e-mail lists from Internet harvesters who gather information about you when you fill out an online form, participate in a newsgroup or chat room, or publish a Web page with your e-mail address on it. This is similar to snail junk mailers who use university student listings, telephone books, and other available databases to get your address. It's up to you to get an unlisted phone number and send letters to creditors and other institutions to remove yourself from their mailing lists. Still, you can't stop all the advertising you're subjected to. Believe it or not, you have more options for combating spam than you do other forms of advertising.

Get Another E-mail Account. Your first line of defense may be to use a Web-based e-mail address when filling out online forms. This won't keep you from getting spam, but by using an alternate e-mail address for filling out forms and not the main account you use for business or communication, you can cut down on the spam in your "real" account. Sign up for a free e-mail account and consider using an alias instead of your real name. (*NOTE: Providing false information may violate the account provider's Terms Of Service.*) Keep track of the information you entered so that you can supply the same information elsewhere when needed. By using an Internet e-mail account, you also avoid downloading junk mail to your local machine.

Use Filtering Options. You can use the filtering options in your e-mail program to block incoming mail from certain sources. AOL gives you the option of blocking all incoming e-mail except messages that come from particular sources you choose. Many e-mail programs have other ways of allowing you to redirect or delete mail as it comes in. While this will not alleviate traffic on the networks, it can help keep your inbox from being bombarded with junk mail. Look for settings called mail filters, rules, junk mail, organize, etc., depending on your mail program, and use these to limit the influx of spam.

Report Abuse. Spam isn't just annoying; it may be against the rules. Many ISPs do not allow their services to be used for sending spam. One way to combat spam is to report the spammer to his service provider. This is often an effective way to get spammers in trouble and keep the junk out of your inbox. You can also call or e-mail your own ISP to see how it can help.

Don't Reply. If you ever hope to eliminate spam, don't reply to it, even if you receive an "unsubscribe" message. Many subscription services have legitimate unsubscribe options, but if you didn't subscribe in the first place, unsubscribing isn't likely to do you any good. Replying will only confirm that the spammer reached someone.

Fight Back. If spam is really driving you crazy, third-party software is probably worth a try. One program, Spam-Killer, by Novasoft lets you filter mail by subject, text, sender's address, or message header. There's also an option to filter spam routed through certain countries. SpamKiller comes with thousands of preset filters, but you can also create a new filter based on a junk e-mail message that has slipped through the radar.

SpamKiller offers a free, 30-day trial and is available for download at http://www.spamkiller.com. After the trial, you can buy it for $29.95.

Another antispam program to try is Spam Buster. A free version will subject you to banner advertisements, but you can purchase it add-free for $19.95 at http://www.contactplus.com/spam/spam.htm. LS

by Anne Shevrin

What You Need To Know

Benefits
Keep your inbox from being flooded with junk e-mail

Time
5 minutes to 1 hour

Skill Level
Easy

Cost
Some solutions are free; as much as $29.95 for antispam software

How To . . .

Solve Problems Printing Web Sites

As you browse the Web, you will inevitably discover pages you want to print for handy reference or more comfortable reading. Usually, this is as easy as choosing Print from your browser's File menu, but sometimes what you see on your screen is not what you get from your printer.

Frames. There are many reasons for a printed World Wide Web page to be different from the one on-screen. One of the most likely is the page is composed of frames. Frames let a Web browser display more than one page at a time, combining them into what appears to be a single page. Some Web pages have obvious frames; others use borderless frames and are harder to spot. When you attempt to print a Web page with frames, you usually end up printing only the active frame, defined by the last place you clicked on the page. If no frame is active, some Web browsers will not display the Print option in the File menu. If the Print command is unavailable, check to make sure the page has finished loading and then click in a blank area of the part of the Web page you want to print to activate the frame and enable the Print command.

If you are using Internet Explorer 5 and Windows 98 or later, you have advanced options for printing framed pages. Open the File menu in Internet Explorer, choose Print, and go to the Print Frames section. The As Laid Out On The Screen option should print a page faithful to the on-screen version. The Only The Selected Frame option will be unavailable if you haven't selected an active frame. The All Frames Individually option produces a separate printed page for each frame. Choose the correct option and click the OK button.

Light-Colored Text. Another common problem involves pages that include light-colored or white text. These pages are difficult to read, if the text prints at all. If you are using Netscape Navigator, you can force it to treat all text as black text for printing purposes. Go to the File menu, select Page Setup, and then place a check mark next to Black Text in the Page Options area. Click the OK button and then try to print the page again.

Formatted Tables. Non-framed Web pages sometimes print navigation text and headlines correctly but with body text missing or garbled in some way. This problem is usually caused by the use of one or more formatted tables. There is a known bug in how some browsers interpret table commands that include embedded formatting. Navigator and IE both suffer from this problem but in different ways. If you keep both Web browsers on your computer, you should be able to print most pages using one browser or the other. Most Web designers are aware of this bug, but be-cause the Web is primarily an on-screen medium, designers aren't usually concerned with how pages print as long as they display correctly on-screen.

If you still can't print the World Wide Web page, there are a few other options to try. Copy the page and paste it into a word processor or text editor. If that works, you can print the page from there. However, this may not work because one of the symptoms of the table bug is that you cannot highlight text on the Web page. If that is the case, look for a Print This Page hyperlink. Many Web sites now provide printer-friendly versions of their Web pages, with advanced formatting removed for easier printing.

You may also find an E-mail This Page link. However, this will not always solve the problem because the e-mail message may just include a hyperlink to the Web page, putting you right back where you started. Look for an option that sends the actual Web page, sometimes referred to as sending a text or HTML copy. Your Web browser may also have a Send Page option under its File menu so you can send the page to your e-mail address.

You also can save a Web page, either in text or HTML (Hypertext Markup Language) format. With Microsoft Internet Explorer, go to the File menu and select the Save As command. In the Save dialog box, choose a format for saving the file. If you are mainly interested in the text of the page, choose the Text File option. Give the file a name and then click the Save button. With Netscape Navigator, you have the option of Save as, or Save Frame as, which is handy if you want to save only the presently active frame.

Tips. If you are still having problems, make sure your browser(s) is current by regularly checking the company's Web site for updates. Companies are always improving browser features, including the ability to render pages properly. LS

by Tom Nelson and Mary O'Connor

What You Need To Know

Benefits
The ability to solve any Web printing problems you may encounter

Tools
Internet Explorer and Netscape Navigator

Time
5 to 15 minutes

Skill Level
Easy

Glossary

ActiveX—A program introduced by Microsoft that is used to instruct certain technologies how to involve COM (Component Object Model) and OLE (object linking and embedding) functions. ActiveX can be incorporated within most programming languages. It lets Web site creators make interactive, multimedia Web pages and links to Microsoft Desktop products to the World Wide Web.

DCC (direct cable connection)—A Windows 95/98 feature that allows two personal computers to connect via one serial or parallel cable. The two computers set up a network connection that allows them to transfer files and share peripherals. This technique is simpler than establishing a LAN (local-area network), but the data transfer rate is much slower. DCC does not require a network interface card.

device driver—A program that allows a hardware peripheral, known as a device, to communicate with a computer. Some device drivers, such as those for the monitor and keyboard, usually come with the computer, while others, such as those for a CD-ROM drive or a sound card, come packaged with their corresponding device. Device drivers, as well as updates for the device drivers, also can be obtained from the manufacturer of the component.

DLL (dynamic-link library)—An executable subroutine stored as a file separate from the programs that may use it. DLLs, which allow for the efficient use of memory because they are loaded into memory only when needed, are used extensively in Windows and OS/2. The DLL file name extensions are .DLL, .DRV, and .FON.

heat sink—Some computer components generate heat as they operate because they run so quickly. To prevent components from overheating and breaking down, heat sinks may be installed to absorb and eliminate the heat. Often, computer manufacturers install these small metal devices on powerful microprocessors, such as Pentiums and Pentium Pros, to keep them from overheating.

hexadecimal numbering system—A base-16 numbering system using combinations of 16 digits to represent all numerical values. In addition to the 10 digits used in the familiar decimal system (0 to 9), hexadecimal uses the letters A through F. For example, the number 10 would be A in hexadecimal, and the decimal number 17 would be written as 11. Computers often use hexadecimal numbers to describe memory addresses. Hexadecimal numbers are sometimes followed by the letter H to avoid confusion with decimal numbers.

IRQ (interrupt request line)—Communications routes within a computer reserved for carrying interrupt signals, which tell the CPU to halt its current task and await further instructions. Different computer components, such as modems, keyboards, mice, sound cards, and other devices, each have a special IRQ set aside for them to use. These IRQs are prioritized according to the importance of each device, so the most important interrupt requests are handled first. A low IRQ number means an important device will be able to override other devices.

JavaScript—A Netscape-developed script language supported by its Navigator Web browsers that allows the creation of interactive Web sites. JavaScript is a relatively simple tool that users should not confuse with Java, a full-fledged programming language developed by Sun Microsystems. JavaScript can, however, be used in conjunction with Java applets.

master/slave arrangement—A situation in which one apparatus controls others plugged into it. For example, a computer (master) controls a printer (slave).

Pins—Refers to the small metal rods in the male ends of various connectors as well as to the metal legs of a microprocessor or other integrated circuit. In both cases, the pins are designed to slide into conductive holes in the female connector.

real mode—An operating mode of Intel's 80x86 processors. In real mode, the processor takes on the attributes of a lower 8086 or 8088 processor in order to run programs specific to those processors. The only DOS-supported operating mode, real mode limits the processor to 1MB (megabyte) of memory. It does not have memory-management or memory-protection features.

Safe mode—A special Windows 95/98 (Win9x) startup mode that allows the system to launch with minimal hardware support in the event of hardware or network configuration problems (often brought on by newly installed devices that conflict with existing ones). In Safe mode, Windows offers only mouse, keyboard, and VGA (Video Graphics Array) support, allowing users to troubleshoot problems that would otherwise prevent Windows from running. If a problem exists, Win9x will automatically launch in Safe mode. Win98 users can initiate Safe mode at startup by pressing and holding the CTRL key (the F8 key launches Safe mode in Win95 and some Win98 machines).

VxD (virtual device driver)—Virtual device drivers act as a simulation buffer between applications and hardware. The drivers sort out and ensure that the correct application gets the information. With this setup, multiple applications can access the same hardware without causing conflict. In a device file name, V means virtual and D means device. The middle character(s) further define the device driver; for example, VmD represents a mouse driver.

Peer-to-peer network—A network setup where the server is non-dedicated, meaning it is also a workstation. Every computer acts on its own by storing files and accessing peripherals (such as printers) and can see every other computer on the network if it has the proper access privileges. This formation is used primarily in smaller networks of less than a dozen computers.

RAM (random-access memory)—(Pronounced ram.) The standard type of memory that is read from and written to by the CPU (central processing unit) and hardware. Information in RAM can be stored and accessed randomly, and therefore, more rapidly. RAM, which is also called main memory, is the vital workspace of computing. The more RAM a system contains, the more information it can handle and the more programs it can run at one time.

Registry—A database that contains information about user preferences and system configuration in Windows 95, Windows 98, and Windows NT. The Registry contains information about which devices are attached to the computer and which drivers should be used with them. It also keeps track of file associations (which programs should be used to open which type of files) and user preferences, such as what the monitor resolution and Desktop pattern should be.

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